The Ministry of Public Administration & Information

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Trinidad and Tobago. Accelerating into the digital future.

Trinidad & Tobago's National Information & Communication Technology Strategy

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EXECUTIVE SUMMARY

Trinidad and Tobago's National Information and Communication Technology (ICT) Strategy is a comprehensive plan that leverages the power of people, innovation, education, information technology and infrastructure to accelerate social, economic and cultural development. The Strategy complements and builds upon Vision 2020, and will play a central role in Trinidad and Tobago becoming a knowledge-based society and achieving its goal of developed country status.

It is a broad and far-reaching Strategy that will provide tangible benefits for everyone within the country. It has been designed in a highly inclusive and transparent manner, actively involving hundreds of people from civil society, government and the private sector. It is a plan for the country's future – designed by the people of the country.

Trinidad and Tobago's National ICT Vision is *"Trinidad and Tobago is in a prominent position in the global information society through real and lasting improvements in social, economic and cultural development caused by deployment and usage of information and communication technology."*

The objective of the country's national connectivity agenda is to:

- Provide all citizens with affordable Internet access;
- Focus on the development of children, and adult skills to ensure a sustainable solution and a vibrant future;
- Promote citizen trust, access, and interaction through good governance; and
- Maximise the potential within all citizens, and accelerate innovation, to develop a knowledge-based society.

The spirit of Trinidad and Tobago's Connectivity Agenda is captured in the following values:

Connected. Committed. Competitive. Creative. Caring. Community.

A domestic and global analysis of Trinidad and Tobago's current level of "e-Readiness" was carried out to provide a baseline for the development of the Strategy. The analysis identified several barriers that are presently inhibiting increased levels of ICT usage amongst the general population

and business. Barriers include high cost of computer ownership, high cost of Internet access, modest Internet speed, and virtually no community access to computers and the Internet for those who cannot afford home PCs. Currently, only 16% of homes have computers and only 9% of the general population consider themselves regular Internet users. As there are very few people on-line there has been little rationale for local businesses to use the Internet to buy or sell goods. Consequently, Trinidad and Tobago's electronic marketplace is very underdeveloped at this time. And, although there are plans for increased levels of ICT in education, it is not widely used in schools, either as a tool or as educational content at this time.

Five Working Groups were established to develop key aspects of the ICT Plan – Human Resources, Economy and Finance, Government, Infrastructure and Legal. The Working Groups met at regular intervals during the planning process, to share their ideas and to identify the numerous dependencies and important points of integration across the five areas of focus. Individually, the Plans are comprehensive, creative and connected – all are integrated with, and dependent upon, one another to achieve their goals. Collectively, they provide a blueprint for an exciting future and a realistic roadmap for getting there.

Highlights of the National ICT Strategy include:

- The *Community Connection Programme*. An initiative to provide hundreds of Community Access Centres in every part of the country. These Centres will provide everyone in the community with an on-ramp to the Internet and access to a broad range of information and services.
- A *Youth Computer Corps Programme* to select and train young adults to work alongside volunteers in each of the Community Access Centres. The *Youth Computer Corps* will not only help build new skills in the local population and workforce but it will also create entry-level employment opportunities that can translate into continuing employment in the ICT sector – a key element of the National ICT Strategy.
- Opening up the telecommunications market to full competition, starting in 2004. Open and effective competition in the telecommunications sector will increase service quality and variety while reducing cost. The result will be faster, cheaper and easier access to the Internet and a marked increase in computer and Internet take-up amongst the general public and small businesses.

- The introduction of a range of tax, and other fiscal incentives, to encourage increased PC ownership by the public and business community.
- By 2008 it is envisioned that over 50% of homes will have personal computers and affordable Internet access, and over 50% of the population will consider themselves "regular Internet users".
- By 2008, over 50% of companies will use the Internet as a business tool.
- *The Knowledge, Innovation and Development (KID) Programme* will provide up-to-date computers and connect all 636 of Trinidad and Tobago's schools to high-speed Internet service by 2008.
- The *KID Programme* will establish educational content and well-defined programmes at each level of the academic system whereby children's achievements and capabilities in ICT can be formally measured and continuously improved.
- A customised training programme to equip teachers with the necessary skills for a more ICT-intensive approach to education will be put in place.
- The *Computers for Schools* (*CFS*) initiative has been identified as an innovative mechanism for maintaining computers in schools and Community Access Centres. The programme will provide additional employment opportunities for scores of people and assist in developing new skills that will help grow the country's ICT sector.
- The *Skills and Knowledge for the Information Era (SKIE) Programme* will incorporate a range of initiatives aimed at training and job creation for those outside of the formal educational system – with a focus on the development of skills in adults.
- By 2008, the *LibraryNet* Programme will provide all libraries with computers and high speed Internet access, and all librarians will receive ICT related training.
- The country's drive for increased levels of connectivity in schools, communities and government will result in significant growth opportunities for local suppliers of computers, software, Internet, installation and repair services and training.
- An ICT Industry Association will analyse the feasibility and resulting strategies for the introduction of new business areas such as call centres, software development, data processing, computer assembly and technology parks that will arise from increased electronic interaction.

- Government will also evaluate the feasibility of attracting a large ICT "anchor company" to the country such as a major software, computer or technology component manufacturer.
- *Student Connections* will place specially trained students from university or community colleges in small businesses or non-profit organisations to assist with the adoption of ICT.
- A programme of specialised training for IT professionals and senior managers will also be prepared. This programme will help senior business people better understand how ICT and the Internet can be effectively applied as business tools to increase productivity, profitability and organisational effectiveness.
- By 2006, all government information will be available on-line – placing particular prominence on topics such as jobs, education, health, and advice for small business.
- By 2008, all government services that are appropriate for on-line delivery will be available over the Internet.
- Government will also review, and amend where necessary, the necessary legislation required to support effective, secure and protected electronic transactions.
- Advisory bodies such as a *National Innovation Council*, *e-Business Roundtable* and *Infrastructure Taskforce* will be assembled to provide advice and guidance and ensure the country's connectivity agenda advances effectively.

An initial funding estimate of US$82 million has been identified for the design and implementation of the ICT Strategy over the next five years. Exact funding requirements will become clearer as each of the various programmes and projects are designed in greater detail. Government will be working closely with the Inter-American Development Bank (IDB) to discuss funding and partnership arrangements.

A series of "Pathfinder Projects" have been identified. They will be introduced over the next twelve months and will provide a solid platform for accelerating the country's connectivity agenda in subsequent years. The Ministry of Public Administration and Information will play a central role in the coordination and integration of the numerous programmes and has identified a dedicated Permanent Secretary to lead the national ICT agenda.

The National ICT Strategy has been designed to benefit everyone in Trinidad and Tobago. It will provide children from the earliest age with new skills, learning and development opportunities. It will bring communities closer together. All citizens will be able to use ICT in their

everyday lives, and will have easy and rapid access to information that is important for their social and economic well-being. Young adults will play a prominent role. They will acquire new skills, share these skills with others in the community and prepare themselves for an exciting and prosperous future in the information era. Important government services will be available at anytime, from anywhere. Small businesses will soon become e-businesses and will be able to compete in arenas that were traditionally only open to larger players. Trinidad and Tobago's ICT sector will expand significantly, thousands of new employment opportunities will be created and investor confidence will continue to grow.

The National ICT Strategy provides the blueprint for a self-sustaining, knowledge-based society. It will be a major contributor in the country's drive for a prominent position in the global information society, and provide Trinidad and Tobago with a giant stride towards developed country status.

Chapter 1

An Introduction to Trinidad & Tobago

Providing the Children of Today
with the Tools for Tomorrow

1. An Introduction to Trinidad and Tobago

Geographical Background

The twin island Republic of Trinidad and Tobago are the two most southerly islands in the Caribbean. Approximately 10 kilometres from the South American mainland, the island of Trinidad covers an area of roughly 4,800 sq. km. Situated 30 km to the north-east, the smaller island of Tobago covers an area of approximately 300 sq. km. Port-of-Spain, located in the north-west of Trinidad, is the country's capital city.

Trinidad and Tobago achieved full independence from the United Kingdom in 1962 and joined the British Commonwealth and United Nations at that time. In 1967, it became the first Commonwealth country to join the Organisation of American States (OAS). In 1976 a Republican constitution was adopted, replacing the Queen as Head of State with a President elected by the Electoral College. In 1995, Trinidad played host to the inaugural meeting of the Association of Caribbean States and has become the seat of this organisation, which seeks to further economic progress and integration among its member states.

Trinidad and Tobago has a population of approximately 1.3 million people. It has a diverse, multicultural community, predominantly of African and East Indian descent. English is the primary language.

Political System

As a Republic, Trinidad and Tobago has a President as Head of State who is also Commander-in-Chief of the armed forces. It is a parliamentary democracy modelled on the UK's "Westminster System".

The Senate consists of thirty-one members, sixteen appointed by the President on the advice of the Prime Minister, six on the advice of the Leader of the Opposition and nine at the discretion of the President. The House of Representatives consists of thirty-six members (thirty-four for Trinidad and two for Tobago) and a Speaker who is elected from either within or outside the House of Representatives. Executive power is vested in the Prime Minister and the Cabinet.

The President is elected by an Electoral College comprising all members of the Senate and the House of Representatives voting by secret ballot.

The People's National Movement (PNM) is the current governing party, under the leadership of Prime Minister Patrick Manning.

Economic Overview

Although Trinidad and Tobago is world famous for its Carnival, tourism, steel bands and calypso music, the backbone of the economy remains the energy sector.

Although Trinidad and Tobago is world famous for its Carnival, tourism, steel bands and calypso music, the backbone of the economy remains the energy sector. New finds of oil and gas strongly indicate that the petroleum industry will continue to be the dominant sector for the foreseeable future – contributing approximately 25% to the nation's GDP. Development in the country's energy sector has spurred growth in many related areas. A major new methanol plant is currently under construction and will be the largest production plant of its kind when it is completed in 2004 – contributing in excess of 20% of global demand. In addition to larger petrochemical producers, many supporting small and medium sized enterprises have flourished, producing goods such as steel, polythene and PVC.

The manufacturing sector is also an important element of the country's economy with textiles, furniture, paper and pharmaceuticals all making significant contributions. In the agricultural sector, areas such as food

and beverage processing, horticulture and floriculture are all prominent.

Although Trinidad and Tobago does not benefit as much from tourism as many other Caribbean islands, the tourism industry does show signs of consistent improvement. This is in large part due to successive governments continuing their emphasis on economic diversity outside of the traditional petroleum sector. Between 1995 and 1999, the number of tourists increased by 38% with tourist-based expenditure growing from US$70 million in 1995 to US$200 million in 1999. Many hotels and guesthouses have been upgraded, and Tobago (the more popular tourist location) has doubled its hotel room capacity in the past five years. Trinidad's annual Carnival is world-renowned and showcases the country's creative energy and cultural traditions. It attracts visitors from all over the world.

Trinidad and Tobago's financial sector is widely recognised as the strongest in the English-speaking Caribbean. In addition to a wide range of smaller financial and insurance institutions, the country has five large commercial banks, six merchant banks, one agricultural development bank, two large corporate financing institutions and four large insurance companies.

The country's main trading partners are the United States, Latin America and the European Union (EU). A significant market is also provided regionally by members of CARICOM. CARICOM is the Caribbean Common Market, established with the objectives of promoting integration of the economies of its 15 member states, coordinating their foreign policies and engaging in functional cooperation in the provision of services such as education, health and transportation.

Principal exports from Trinidad and Tobago	% of total	Principal imports to Trinidad and Tobago	% of total
Mineral fuels	66	Machinery and transport equipment	40
Chemicals	18	Manufactured goods	20
Steel products	5	Mineral fuels	20
Manufactured goods (excl steel)	4	"Other"	20

Summary of principal imports and exports
Source: Inter-American Development Bank, October 2002

Recent Economic Performance

2002 marked the ninth year of growth for the Trinidad and Tobago economy.

2002 marked the ninth year of growth for the Trinidad and Tobago economy. From the mid-1980s until 1994, the country's reliance on the petrochemical sector saw the country suffer from recession following a slump in oil prices. Since then, however, it has progressively transformed from a centrally planned economy, where oil revenue was used to subsidise state owned companies and social and infrastructure projects, to a free market economy with government emphasising economic diversification, export-oriented growth and an increased role for the private sector.

Economic activity in Trinidad and Tobago continued to expand through 2002 and into 2003 – but at a slower pace than in 2001

Economic activity in Trinidad and Tobago continued to expand through 2002 and into 2003 – but at a slower pace than in 2001. The modest slowdown is best attributed to uncertainties that have affected events both at home and abroad. Growth in most industrialised countries was well below potential with soft labour markets and weak consumer and business confidence. At home, the close-run parliamentary election in 2002 may have prompted consumers and businesses to postpone some spending plans, leading to sluggishness in domestic demand. This was further affected by the slowdown in the regional economies, which impacted on the performance of non-energy exports. Nevertheless, economic conditions remained favourable as inflation declined, labour market conditions improved and the balance of payments registered a small overall surplus.

Real GDP growth in 2002 was 3.2 per cent compared with a revised estimate of 4 per cent in 2001. The energy sector made a significant contribution to economic growth as real value added rebounded and increased by 10.7 per cent compared with a relatively weak performance (0.7 per cent) in 2001. Petroleum and petrochemicals production and exports expanded as two new plants came on stream and the prices of many of these commodities trended upward during the year. The weak global economic recovery impacted heavily on the non-energy sector which grew by just 1 per cent despite strong performances in the Electricity and Water (10.8 per cent), Distribution (11.2 per cent) and Construction (5 per cent) sectors. The country's manufacturing sector declined by 2.9 per cent.

Trinidad and Tobago's unemployment rate declined to an average of 10.4 per cent in 2002 from 10.8 per cent in 2001. The number of employed persons increased by 11,000 to 525,100 in 2002 and many of the new jobs were generated in the Services sector, particularly in Distribution and Transport, Storage and Communications.

The inflation rate slowed in 2002 to 4.2 percent from 5.5 per cent in 2001. The increase in the prices of the food component, the major influence on the Retail Prices Index, remained high at 10.2 per cent, but this was less than the 13.9 per cent recorded in 2001. As an indicator of underlying inflationary pressures, the non-food component of the Retail Prices Index increased by just 0.6 per cent in 2002, from 1.1 per cent in the previous year.

The central government's accounts deteriorated to a deficit of $181 million in 2002 (-0.3 per cent of GDP) following a surplus of $1,039 million (1.8 per cent of GDP) in 2001. The return to a deficit position resulted from an increase in spending (6.2 per cent) accompanied by a decline in revenues (2.9 per cent). The rise in central government's expenditure was mainly due to the payment of wage arrears to public servants and higher transfers to households reflecting the increase in old aged pensions.

The weighted average selling rate of the TT dollar depreciated from TT$6.2314 to US$1 in 2001 to $6.2473 to US$1 in 2002.

Item	1995	1996	1997	1998	1999	2000	2001	2002
Inflation Rate %	5.3	3.3	3.6	5.6	3.4	3.6	5.5	4.2
Unemployment %	17.2	16.2	15	14.2	13.2	12.2	10.8	10.4
GDP growth	3.19	2.91	2.96	3.98	5.02	4.67	3.49	3.2
GDP/Capita (US$)	4,378	4,575	4,445	4,966	5,369	6,360	6,921	7,241
US $ Exchange	5.947	6.034	6.285	6.298	6.299	6.299	6.231	6.247
Population	1.26	1.264	1.275	1.278	1.284	1.29	1.296	1.32
Labour Force	521,000	530,400	541,000	558,700	563,400	564,000	568,500	579,000

Recent Economic Performance Indicators

Source: Inter-American Development Bank, October 2002

Economic Outlook for 2003

The economic outlook for Trinidad and Tobago in 2003 is for a slight pickup in economic growth

The economic outlook for Trinidad and Tobago in 2003 is for a slight pickup in economic growth with continued price stability and some strengthening in the balance of payments. Real GDP growth is expected to be in the vicinity of four per cent. The energy sector should maintain a strong performance in 2003 as additional capacity comes on stream with the commissioning of the Atlantic Liquefied Natural Gas (ALNG) train III facility. Output is also expected to be boosted by the expansion in the productive capacity of ALNG Train II facility and the Caribbean Nitrogen Company, which will each record a full year's production in 2003. In the non-energy sector, increased government spending is expected to stimulate activity in the economy, in general, and the construction sector in particular.

The Central Bank is committed to monetary stability and is looking to maintain inflation at about 4.5 per cent.

There are, of course, downside risks to this positive outlook for 2003. The underlying economic fragility in the industrialised economies is still to be addressed and the rebound in confidence expected with the end of the war in Iraq may not fully materialise.

Government's Medium Term Policy Outlook

The Government identified the achievement of developed nation status by the year 2020 as the principal developmental goal of the country.

In the Budget Speech for fiscal 2002/2003, the Government identified the achievement of developed nation status by the year 2020 as the principal developmental goal of the country. A multi-sectored group comprising persons from the public sector as well as leaders from the private sector and civil society has been established to develop a Strategic Development Plan covering several areas including energy, agriculture, tourism, education and skills development and training.

In order to achieve this goal, the government has developed a number of policy objectives that define the nature and scope of the social and economic transformation that will take place over the medium term. Some of the highlights are provided below:

Economic Policy Objectives:

- ✓ Sustaining strong economic growth by pursuing prudent fiscal and monetary policies, maintaining a favourable balance of payments and adopting measures to stimulate savings and investment;
- ✓ Placing greater emphasis on the development of key sectors so as to improve the growth potential of the economy;
- ✓ Improving the manufacturing and services sectors by accelerating structural transformation and to develop the agricultural sector;
- ✓ Enhancing the competitiveness of exports.

Social Policy Objectives:

- ✓ Promoting human development by enhancing the human capital base so as to produce a workforce that is highly skilled and knowledgeable;
- ✓ Enhancing social conditions by increasing the provision of social services and improving accessibility to these services;
- ✓ Improving social equity and harmony in the society by eradicating poverty and reducing imbalances.

Environmental Policy Objectives:

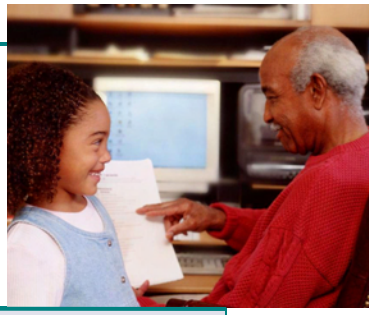
- ✓ Protecting and conserving the environment through strategies that ensure sustainable long-term growth and development.

Chapter 2

Accelerating Social and Economic Development through the use of ICT

A National Undertaking with
Roles and Benefits for Everyone

2. Accelerating Social and Economic Development through the use of ICT



Vision 2020

The Government of Trinidad and Tobago has initiated a progressive vision to transform the country into a developed society by the year 2020.

In presenting "Vision 2020", Prime Minister Patrick Manning stated that "the vision of Trinidad and Tobago becoming a fully developed country means that all citizens will enjoy a high quality of life in all areas including housing, health, education, transportation, telecommunications, water and electricity". Mr. Manning added "it is envisaged that the society will be one which is inclusive, cohesive and caring with strong spiritual and ethical values, imbued with a deep sense of nationalism. The Government will be effective and exercise good governance with integrity in all spheres of public life, while the public sector agencies will be efficient, results oriented and customer focused".

Seizing the Opportunity of the Global Information Society

A major facet of Vision 2020 is the development of a strategy to facilitate the transformation of Trinidad and Tobago into a knowledge-based society through the effective use of Information and Communication Technology (ICT).

A major facet of Vision 2020 is the development of a strategy to facilitate the transformation of Trinidad and Tobago into a knowledge-based society through the effective use of Information and Communication Technology (ICT). ICT is a term given to the integrated use of informatics, information and communication tools and infrastructure to assist in the development of knowledge and the resulting acceleration in social and economic development. Knowledge has always been at the core of human progress and endeavour. Yet now, as never before, individual and collective ability to create, share and utilise knowledge has become the driving force in

shaping all our futures. Today, the dramatic increase in the volume, speed and ubiquity of information flow that has been made possible through ICT has already brought about profound changes in the demands and expectations upon government, business, civil society and the individual.

By harnessing the potential of ICT, in all areas of human life, national and local governments can now provide new and better responses to vital and longstanding issues, such as poverty reduction and wealth creation, as well as education, equity and social justice.

To be competitive in today's connected world, a nation must learn not only how to produce and sell better, but also how to manage its wealth of knowledge. Countries must find ways to generate new knowledge, translate information into knowledge that is useful for development goals and business competitiveness, and effectively capture global information and apply it locally. It is impossible to participate adequately in today's global economy without proper information and knowledge management as a fundamental part of all productive and commercial activity. The increasing importance of knowledge in economic development demands that a sustainable learning society be established in conjunction with any national economic development plan.

The new forms of world interconnectedness offer unprecedented opportunities for all countries - particularly emerging nations such as Trinidad and Tobago.

The new forms of world interconnectedness offer unprecedented opportunities for all countries - particularly emerging nations such as Trinidad and Tobago. There is also a threat, however, which presses everyone to act as quickly as possible. Due to the rapidity of technological change, the cost of *not* participating is also rising daily, thereby widening the gap between the "connected" and the "disconnected" and increasing the difficulty of closing that gap as time goes on.

Trinidad and Tobago's National ICT Strategy

Prime Minister Manning formally launched Trinidad and Tobago's National ICT Strategy on May 2, 2003. In his speech to launch the initiative, Mr. Manning emphasised, "ICT sits at the core of everything we must do to improve the efficiency, productivity and competitiveness of our nation. ICT has those ingredients which, if employed properly,

could make this sector of our community not only a generator of national prosperity, but an instrument of economic and social justice in Trinidad and Tobago".

The Prime Minister set out a number of clear outcomes to assist in advancing the ICT agenda, including:

- Development of a world-class telecommunications and computing infrastructure;
- Further liberalisation of trade in the telecommunications sector;
- A "quantum leap" in the development of e-Commerce within the country – with specific emphasis on small and medium-sized enterprises;
- Easy and efficient access to electronic government information and services;
- The development of Community Access and Computers for Schools Programs;
- Nationwide training, awareness and sensitisation in the areas of computer literacy, Internet usage, e-Commerce and associated technologies.

An ICT Steering Team has been established under the chairmanship of the Minister of Public Administration and Information. The Steering Team has been mandated to develop the National ICT Strategy that will support the achievement of the country's development goals.

The National ICT Strategy is to present a detailed roadmap and series of related actions by which Trinidad and Tobago will achieve key development objectives through the expansion, growth and leverage of a world-class ICT sector.

The National ICT Strategy is to present a detailed roadmap and series of related actions.

Five Working Groups have been appointed to focus on key elements of the Strategy:

- *Human Resources* – including Community Access, Computers for Schools, education and skills development etc.
- *Economy and Finance* – e-Commerce and the development of the ICT Sector
- *Government* – the electronic delivery of government information and services

- *Infrastructure* – the provision of accessible, effective and affordable levels of connectivity, hardware and software
- *Legal* – the provision of appropriate enabling legislation and policy

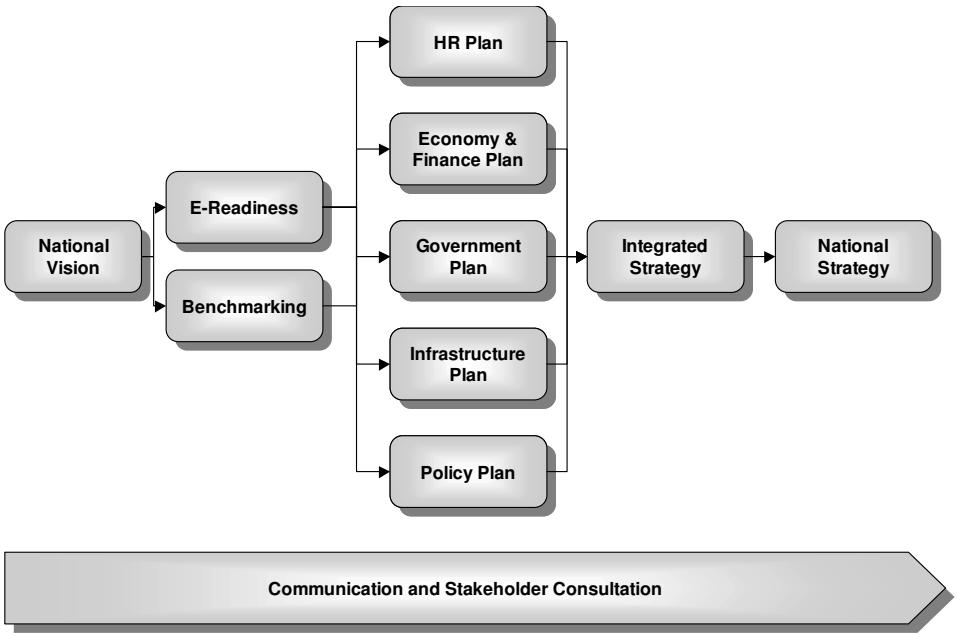
Recognised leaders from the public or private sector chair each Working Group. Membership of each group comprises of highly experienced and knowledgeable individuals from the national community, each one having a specialised understanding of their respective Working Group's area of focus. The Working Groups have been structured to ensure broad representation and participation by public sector, private sector and civil society. Composition of the Working Groups is shown at Appendix F.

Development of the National ICT Strategy was set an aggressive five-month timeframe – May to September 2003.

ICT Methodology

The ICT Planning Secretariat utilised a traditional ICT development methodology to help direct the project. The methodology comprised of five key stages:

1. Development of a National ICT Vision
2. Establishing the current state of ICT using:
    a. An internal e-Readiness assessment
    b. Benchmarking against comparator countries
3. Developing Action Plans for each of the five Working Groups
4. Development of an integrated National ICT Strategy
5. Presentation and acceptance of the National ICT Strategy



National ICT Development Methodology

An environment of openness, collaboration and broad stakeholder partcipation was employed througout the strategy development process. This helped ensure that all opinions were heard and considered as the plan took shape. The National ICT Secretariat developed a website (www.nict.gov.tt) where all documents were posted for comment and feedback prior to being incorporated into the final documents.

Chapter 3
Defining the Future

With ICT my Small Business is Now a Global e-Business

3. DEFINING THE FUTURE

National ICT Vision

Following the formal launch of the ICT initiative, members of the Working Groups and the Steering Committee met to develop a National ICT Vision that would establish clear goals and objectives for the overall strategy and for the Working Group Action Plans. A series of options for the National ICT Vision was developed using a workshop breakout format. The preferred option was then selected and refined before being posted on the NICT website for public comment.

The National ICT Vision:
"Trinidad and Tobago is in a prominent position in the global information society through real and lasting improvements in social, economic and cultural development caused by deployment and usage of information and communication technology."

The National Connectivity Agenda will:

- Provide all citizens with affordable Internet access;
- Focus on the development of children, and adult skills to ensure a sustainable solution and a vibrant future;
- Promote citizen trust, access, and interaction through good governance; and
- Maximise the potential within all citizens, and accelerate innovation, to develop a knowledge-based society.

The spirit of Trinidad and Tobago's Connectivity Agenda is captured in the following values:

Connected. Committed. Competitive. Creative. Caring. Community.

Desired Outcomes for the Working Groups

Following the ICT Visioning Workshop, each of the five Working Groups established an initial series of desired outcomes that would then be refined over the course of the strategic planning exercise. Each of the desired outcomes will, collectively, contribute to Trinidad and Tobago achieving its National ICT Vision.

Working Group	Initial Desired Outcomes
Human Resources	▪ All schools and libraries to be connected ▪ ICT training and education to be fully integrated into the school curriculum – as a tool and as content ▪ Standardised measures of ICT proficiency ▪ Universal access made available through Community Access Centres – time/distance to access point to be determined ▪ Business opportunities to exist for ICT workers ▪ All Government workers on-line and ICT literate ▪ An appropriate body organised, and in place within one year to manage ICT development
Economy and Finance	▪ Increased levels of e-Commerce contributing directly to job creation and poverty reduction ▪ Accelerating take-up of ICT – particularly for SMEs ▪ Development of an ICT sector – including innovative new business opportunities ▪ Exploring "hub strategies" in the areas of finance, oil, gas etc. ▪ Using ICT as a catalyst for business modernisation – technology and business integration and the improvement in the physical delivery of goods ▪ Ensuring consumers benefit from increased ICT ▪ Stimulating greater electronic business to government interaction ▪ Identifying the role of the private sector in terms of ICT sustainability

Working Group	Initial Desired Outcomes
Government	▪ All Ministries, Agencies and Departments connected ▪ All appropriate government information and services available electronically – via the Internet and telephone ▪ Appropriate community-based services on-line ▪ Government service delivery standards improved ▪ Measurable efficiencies as a result of e-Government ▪ Increased client-focus and transparency ▪ Government intranet created ▪ Government services promoted to and accessible by the Diaspora
Infrastructure	▪ Appropriate technology infrastructure and standards to support current and future ICT needs ▪ Improved service standards and accessibility of ICT, and lower costs ▪ Increased competition introduced to ICT sector ▪ SMEs benefiting from utilisation of ICT infrastructure ▪ New ICT businesses established ▪ Growing number of jobs in ICT sector ▪ Rationalisation of infrastructure in government ▪ Proactive, well-supported, and innovative regulator
Legal	▪ Telecom liberalisation including a strong regulatory framework ▪ Ensuring appropriate legislation in areas such as: ✓ Universal Access ✓ Electronic crimes ✓ Privacy and confidentiality ✓ Freedom of Information ✓ Data security ✓ Intellectual Property ✓ Inappropriate content ✓ Fraud ▪ Acceptability of electronic documents – e.g., "admissibility of evidence" ▪ Ensuring appropriate training for the legal community – including law enforcement

The National ICT Vision establishes far-reaching social and economic growth objectives.

The National ICT Vision establishes far-reaching social and economic growth objectives that contribute significantly to Trinidad and Tobago's 2020 agenda. The initial set of desired outcomes for ICT provide each of the Working Groups with a number of tangible goals and objectives. However, before the planning process advances too far, it is important to understand the current level of connectivity and the state of "e-Readiness" within the country. Armed with clear targets and an accurate baseline, the Working Groups can then develop detailed, and pragmatic, Action Plans that move Trinidad and Tobago from its current state of connectivity to a future where the benefits of increased connectedness have a marked effect on all elements of society.

Chapter 4

A Snapshot of ICT in Trinidad & Tobago - 2003

ICT. Connecting People, Communities and Countries

4. A SNAPSHOT OF ICT IN TRINIDAD AND TOBAGO - 2003

Background to e-Readiness

e-Readiness is the degree to which a community is prepared to participate in the global information society.

Before any country commences on a comprehensive connectivity program, it is important to understand its current level of "e-Readiness". e-Readiness is the degree to which a community is prepared to participate in the global information society, and is gauged by assessing areas that are most critical to the adoption of Information and Communication Technology (ICT).

As an integral part of Trinidad and Tobago's National ICT Strategy, the e-Readiness Assessment examined five areas that mirror the five Working Groups established by the ICT Steering Committee:

- Infrastructure
- Human Resources
- Economy and Finance
- Government
- Legal and Policy

The framework for this analysis was adapted from "Readiness for the Networked World: A Guide for Developing Countries" – an internationally recognised methodology published by the Center for International Development at Harvard University. Additional data to support the findings and conclusions came from a variety of sources including:

- "National E-Commerce Strategy for Trinidad and Tobago, 2004-2010" by the National E-Commerce Secretariat;
- "Government e-Readiness Survey", by the e-Government Unit of the Ministry of Public Administration and Information;
- "Survey on ICT Usage in Trinidad and Tobago", by MORI ; and
- "Utilisation of Information Technology by Households in the Republic of Trinidad and Tobago", by the National Institute Of Higher Education Research Science and Technology (NIHERST).

At the outset, it is important to understand that Trinidad and Tobago is already an active member of the global information society. It is currently ranked 58th (out of 82 countries) in the World Networked Readiness Index published annually by the World Economic Forum. This year, Trinidad and Tobago slipped to 58th position from a 2001-2002 ranking of 46th. This emphasises the point that although the country is making progress in terms of connectivity, it is not progressing quickly enough, or with sufficient coordination, to avoid being overtaken by other nations. Trinidad and Tobago's integrated National ICT Strategy will go a long way towards accelerating the country's connectivity agenda and should assist in strengthening its Networked Readiness Index ranking in the coming years.

This year, T&T slipped to 58th position from a 2001-2002 ranking of 46th.

Detailed analysis regarding Trinidad and Tobago's current level of e-Readiness can be found at Appendix A and an international ICT Benchmarking Assessment can be found at Appendix B.

Trinidad and Tobago's Level of e-Readiness - 2003

Infrastructure

Trinidad and Tobago currently has in place a level of infrastructure that satisfies the basic needs of a country embarking on a major connectivity agenda.

Trinidad and Tobago currently has in place a level of infrastructure that satisfies the basic needs of a country embarking on a major connectivity agenda. It has a reliable telephone network that covers virtually all parts of the country. Call completion is high at 98%, and with only 4-6 faults per 100 main telephone lines, it scores very well in terms of network quality and reliability. Over three-quarters of all homes have telephones.

Network speed is less encouraging however. Most of the country has a maximum dial-up speed of 56kbps although there are some areas that benefit from Integrated Services Digital Network (ISDN) services and Asymmetrical Digital Subscriber Line (ADSL) service coverage and accompanying speeds of 64-256kbps. A small number of leased lines can offer high-speed access of up to 1.5Mbps, but the level of benefit often does not justify the significantly increased monthly expense.

The people of Trinidad and Tobago have fully embraced the revolution in cellular telephones. There is now thought to be in excess of 450,000 cellular phones in the country – an increase of over 60,000 within the last six months. Cellular phones are now used by about 50% of the adult population.

At this time the primary medium for communication remains the telephone. About one in three persons has Internet access, and about one in five who has access use the Internet every day. This usage is considered low. There appears to be a number of factors for this. With virtually all hardware and software being imported at world prices, the cost of personal computers is high in comparison to average income levels. Consequently in 2002, only a small percentage of households (~16%) have computers. Internet access charges are also high (~TT$125 for 50 hours), and with only modest network speeds currently available users are generally limited to sending e-mails or web browsing. Not surprisingly, only 9% of the population consider themselves to be "regular Internet users" (i.e., use the Internet several times a week) – most still prefer to use telephones (fixed or mobile) for communication. However, among those who do not have access to the Internet, and would want some Internet-related service at a community centre, 76% would be willing to pay $TT10 per hour to access the Internet at a community access point.

Only a small percentage of households (~16%) have computers.

Only 9% of the population consider themselves to be "regular Internet users"

It is a very similar story within the T&T business community. Although 87% of companies have PCs and Internet access through telephone dial-up, very few companies (with the exception of the major industries) have invested in dedicated data lines or extensive office automation. As there are only a small number of consumers currently on-line, there is little rationale for companies to use the Internet as a business medium. Most are using it for e-mail and for a basic web presence, i.e., static web sites.

There is little rationale for companies to use the Internet as a business medium.

Human Resources

Use of computers and Internet technology remains very limited among the general public due to a number of factors: minimal ownership of personal computers (~16%), scarcity of public access centres for those who cannot afford computers, and high costs associated with Internet access. Although a few initiatives have been started, there is currently no coordinated efforts to introduce a comprehensive community access programme, however there are several Internet cafes available in parts of the country and TSTT has provided access to the Internet at libraries and some post offices. There is only a limited amount of local content

(health, education, culture, safety, employment etc.) on websites, which may also account for reduced take-up rates.

The use of ICT in the workplace is also fairly limited

The use of ICT in the workplace is also fairly limited. Although virtually all businesses have computers and access to the Internet via telephone dial-up, a significant number of employees share computers and only a few have personal e-mail addresses for use in the work environment.

There are approximately 636 schools in Trinidad and Tobago. It is not clear exactly how many schools have Internet access at this time – however it is not a large number. A small number of secondary schools have some form of "computer laboratory", and a pilot programme for seven additional schools is currently underway. The Secondary Education Modernisation Programme (SEMP) plans to network an additional 81 schools by September 2003. Higher education institutions do benefit from a greater degree of ICT sophistication.

Currently, there is incomplete information available regarding the level of ICT education included in the general curricula; however, the importance of ICT education and training, and its role in ensuring a sustainable connectivity agenda, is widely understood. Fortunately, ICT is seen by 95% of the population as an appealing career for young people, above medicine (91%), accounting (90%) and law (85%).

The ICT sector in Trinidad and Tobago is a developing but fledgling one at present, with a small number of skilled IT workers (~3000). The general workforce in T&T understands the importance of having ICT related skills. However with only a few positions available, and with the high cost of training and certification, despite ICT being viewed as an attractive career, many are concerned that the resulting employment opportunities are not forthcoming. With only a limited number of ICT positions available, Trinidad and Tobago must guard against the danger of losing many of its talented ICT professionals to other countries, including CARICOM countries.

Economy and Finance

Virtually all companies in Trinidad and Tobago have the basic requirements for Internet service, i.e., Computers and Internet access through the telephone. But, as there is only a very small percentage of the population currently using the Internet there is little reason for businesses to be using it as a medium for client interaction. As a result, the Business to Consumer (B2C) marketplace in T&T is underdeveloped at this time. Many companies have simple websites that offer browsing for consumers but there is extremely little in the way of on-line sales functionality. The small numbers of consumers who do visit company websites as part of the purchasing process are primarily using it for price and product comparison, and are still making the final purchase in a traditional manner. Public concerns about on-line privacy and security may also be barriers to increased levels of B2C interaction.

The Business to Consumer (B2C) marketplace in T&T is underdeveloped at this time.

Outside of the major institutions, there is very little evidence of a Business to Business (B2B) marketplace in Trinidad and Tobago. Most of the SME sector still source and acquire buyers and suppliers through previous relationships, word of mouth and Yellow Pages. More sophisticated forms of electronic business, Customer Relationship Management, e-Procurement, Supply Chain Management etc. are virtually non-existent.

There is very little evidence of a Business to Business (B2B) marketplace in Trinidad and Tobago.

ICT employment opportunities are currently very narrow – particularly with SMEs. Most of the country's 3000 positions reside in the IT/Telecom sector, the Financial Services Sector, or with Government. Salaries for experienced professionals can be high in comparison to GDP, however the threat of a "brain drain" in the ICT sector remains very real.

Government

The Government of Trinidad and Tobago is in the very early stages of its e-Government agenda. The vast majority of government services are provided in-person and information is stored primarily in paper files or on desktop computers.

The Government of Trinidad and Tobago is in the very early stages of its e-Government agenda.

Approximately 50% of Ministries have websites, but these sites lack a government-wide "common-look-and feel". Most websites provide static information, but not necessarily packaged around the needs of the end user. Some Ministries have simple downloadable forms that can be printed, completed and mailed in, but none offers extensive on-line transactions at this time. Unfortunately only 5% of the population currently prefers to pay for government services via the Internet at this time.

The Ministry of Public Administration and Information is currently developing an e-Government Strategy as part of a broader Public Sector Modernisation Program. The e-Government Strategy will examine the design and development of a full suite of electronic services and products tailored around the specific needs of citizens, businesses and visitors to the country. Work has started on a public service-wide email, messaging and scheduling system – Phase 1 of a Communications Backbone initiative.

Legal and Policy

Telecommunications Services of Trinidad and Tobago (TSTT) is the country's incumbent telecommunications operator. TSTT is 51% owned by the Government and is currently the dominant local telephony carrier. Competition exists in all non-voice domestic services such as Internet, paging, wireless and data. All international voice traffic is currently carried by TSTT.

There are currently nine established Internet Service Providers (ISPs) in T&T. However it is widely felt that an inadequate competitive environment currently exists and that this is restricting price, quality and service in the telecom and ISP sectors. There has been a level of pressure applied to Government in recent years with a view towards accelerating liberalisation of the telecommunications sector.

Trinidad andTobago has carried out a significant amount of preparatory work readying its legislation and policy for increased levels of ICT usage.

Trinidad and Tobago has carried out a significant amount of preparatory work readying its legislation and policy for increased levels of ICT usage. It has a modern Telecommunications Act (2001), which provides for the establishment of a comprehensive legal framework for an open telecommunications sector. It has the Computer Misuse Act 2000 that deals with unauthorised access, use or interference with computers and other related matters; and The Electronic Transfer of Funds (Crime) Act 2000 that regulates the transfer of money by an

electronic terminal, by use of a card, for the purpose of instructing or authorising a financial institution to debit or credit a cardholder's account when anything of value is purchased.

Additional work has been carried out in drafting the Electronic Transactions Bill 2001 that sets the basic framework for the legal recognition of electronic records and transactions. Drafting was completed on The Data Protection Bill 2001 that seeks to protect an individual against disclosure of his personal information except in certain prescribed conditions.

The Legal Team in the Ministry of Public Administration and Information is currently addressing a wide range of ICT enabling issues such as Jurisdictional Conflicts, Anti-Competitive Practices, Internet Taxation, Intellectual Property Protection, Consumer Protection, E-Commerce Act and the Management of Domain Names.

e-Readiness Findings

In terms of ICT development, Trinidad and Tobago represents a perfect reflection of the small-island developing state as portrayed in the 2002 study "Networked Readiness and Small Island Developing States", by Geoffrey S. Kirkman, of the Center for International Development at Harvard University. These characteristics are:

In terms of ICT development, Trinidad and Tobago represents a perfect reflection of the small-island developing state.

- Some elements of development in network access and infrastructure build out
- Strong use of fixed line and cellular telephone service
- Low general Internet usage, mirrored by low availability of business and government online services
- Lagging in telecommunications liberalisation, affecting competition, price and quality of service
- No definitive broadband policy

Due to a variety of historical and economic circumstances, T&T finds itself in somewhat of a "negative supply-and-demand cycle" of ICT usage:

Desire

- Development of a knowledge-based society leading to increased social and economic development through enhanced levels of

connectivity and electronic interaction at a domestic, regional and international level.

Challenge

- Cost of PC ownership, Internet access and affordability issues and slow speed/limited bandwidth results in only limited numbers of the general public utilising the capacity offered by the Internet.

Effect

- Most businesses see little value in offering products and services on-line as there are few consumers currently using the Internet for commerce.
- Restrictive bandwidth reduces benefits of delivering more sophisticated business-to-business transactions.
- The Electronic Marketplace remains underdeveloped and provides even less incentive for consumers and businesses to go on-line.

Outcome

- ICT development impasse and increased potential for brain-drain of ICT professionals.

Connecting to the Future

The e-Readiness Assessment and Benchmarking Analysis provided a realistic overview of ICT preparedness in Trinidad and Tobago. Using this as a baseline, and the strategic outcomes as future targets, each of the Working Groups set about developing Action Plans to transition the country towards increased levels of connectivity and tangible enhancements in social and economic development.

Chapter 5

Connecting to the Future

Trinidad & Tobago – A Knowledge Based Society

5. CONNECTING TO THE FUTURE

Working Group Action Plans

Over the course of several weeks, each of the five Working Groups discussed, developed and refined a number of connectivity programmes and projects specific to their area of focus. Each Action Plan identifies a series of broad and far-reaching initiatives that will accelerate Trinidad and Tobago into a knowledge-based economy and provide ongoing benefits for all elements of society. The Plans also take into account the current level of e-Readiness to ensure they remain practical and achievable.

The Working Groups met at regular intervals during the planning process to share their ideas and to identify the numerous dependencies and important points of integration across the emerging programme areas. Individually, the Plans are comprehensive, creative and connected – all are integrated with, and dependent upon, one another to achieve their goals. Collectively, they provide a blueprint for an exciting future and a realistic roadmap for getting there. Although the Plans incorporate elements of international best practice in ICT and connectivity, the result is very much a "made in Trinidad and Tobago" solution.

Action Plans for each of the individual Working Groups can be found at Appendix E.

Integrated National Strategy

From Vision to Reality

The Action Plans identify the various strategies, programmes and projects that are necessary to achieve all aspects of Trinidad and Tobago's National ICT Vision.

As a reminder, the National ICT Vision is:
"Trinidad and Tobago is in a prominent position in the global information society through real and lasting

improvements in social, economic and cultural development caused by deployment and usage of information and communication technology."

The National Connectivity Agenda will:

- Provide all citizens with affordable Internet access;
- Focus on the development of children, and adult skills to ensure a sustainable solution and a vibrant future;
- Promote citizen trust, access, and interaction through good governance; and
- Maximise the potential within all citizens, and accelerate innovation, to develop a knowledge-based society.

The following pages examine various elements of the National ICT Vision and explain how these goals will be achieved through the ICT Strategy.

Providing Affordable Internet Access to all Citizens

The Community Connection Programme (CCP) will establish hundreds of Community Access Centres (CACs) in every part of the country.

The *Community Connection Programme* (*CCP*) will establish hundreds of *Community Access Centres* (*CACs*) in every part of the country. These Centres will provide everyone in the community with an on-ramp to the Internet and access to a broad range of information and services. *CACs* will be particularly important for those members of society who cannot afford a computer at home.

Situated wherever possible in schools and libraries to reduce cost and leverage investment, *CACs* will help everyone, wherever they live, take advantage of emerging opportunities in the new global knowledge-based economy. Each Centre will be designed around the specific needs of the community and provide up-to-date computers, each with high-speed Internet connectivity. The Centres will be designed to provide "universal access" – catering for all members of society, including those with physical, mobility and learning disabilities.

All *CAC* users will be provided with access to a wide variety of on-line information sources including:

- Local and community information and services
- Information regarding jobs, health, taxes and education etc.
- Government information and services such as school registration, unemployment benefits, birth certificates, passport applications, regulatory requirements, etc.
- On-line learning

- Business information and services – especially for start-up and small businesses
- Information specifically tailored to the needs of children, senior citizens and young mothers
- Simplified links to communicate with family and friends abroad

The NICT Strategy will seek to find mechanisms to encourage community ownership of *CACs* wherever possible.

A *Youth Computer Corps Programme* will also be established to select and train young adults to work alongside volunteers in each of the *CACs*. Young adults placed in these positions will be paid for their service. They will need to successfully complete a formal certification programme allowing them to provide high quality services and advice in a number of areas such as computer training, Internet training, e-Commerce training, technical assistance for small businesses, website design, troubleshooting, etc. The *Youth Computer Corps* will not only help build new skills in the local population and workforce, but it will also create entry-level employment opportunities that can translate into sustaining employment in the ICT sector – a key element of the National ICT Strategy.

The *Community Connection Programme* will be funded and sustained through a variety of sources including government funding, modest user fees, small charges for training and technical assistance, and through corporate sponsorship and other private sector involvement strategies.

In concert with *CCP*, a plan to dramatically increase the number of home-based Internet users will be put in place. This plan will be stimulated by opening up the telecommunications market to full competition starting in 2004. Open and effective competition in the telecommunications sector will increase service quality and variety while reducing cost. The result will be faster, cheaper and easier access to the Internet and a marked increase in computer and Internet take-up amongst the general public and small businesses. As more users get connected there will be a corresponding demand for local hardware, software and technical support. This in turn will develop additional employment and skills in the ICT sector. As the domestic market flourishes, the local population will benefit from cheaper, higher quality ICT products that will stimulate even further domestic growth and achieve the positive supply and demand cycle that is critical in ensuring long-term sustainability for the ICT sector.

By 2008 it is envisioned that over 50% of homes will have personal computers and Internet access.

Over 50% of the population will consider themselves "regular Internet users".

By 2007, over 50% of companies will use the Internet as a business tool

By 2008 it is envisioned that over 50% of homes will have personal computers and Internet access, and over 50% of the population will consider themselves "regular Internet users". By 2008, over 50% of companies will use the Internet as a business tool and will be realizing increased revenues as a result. To assist in this matter, Government will examine a series of tax and other fiscal incentives that could be employed to stimulate increased ownership of computers and encourage ICT take-up by citizens and the business community.

A comprehensive promotion campaign will be mounted to increase awareness of the country's connectivity agenda and to inform citizens and business owners of the benefits of increased on-line interaction. This will be a multi-media campaign using television, radio, print, outdoor, and new media (web) strategies. As well as a general awareness campaign, targeted messaging will be used to address specific benefits for groups such as children, young mothers, senior citizens and small businesses. A national theme and logo will be developed to emphasise the integration of the various ICT programmes and as a tool for promoting Trinidad and Tobago's drive for connectivity on the international stage.

Focusing on the Development of Children and Adult Skills

The Knowledge, Innovation and Development (KID) Programme is key to establishing a knowledge-based society and a cornerstone of the country's ICT Strategy. Working closely with the *Secondary Education Modernization Programme (SEMP)*, which is already underway, the *KID Programme* will provide up-to-date computers and connect all 636 of Tinidad and Tobago's schools to high-speed Internet service by 2008. The Programme will look beyond networked education on a school-by-school basis and attempt, over time, to develop an interactive network of innovative schools at a national and international level.

The KID Programme will provide up-to-date computers and connect all 636 of Trinidad and Tobago's schools to high-speed Internet service by 2008.

A student-to-computer ratio of approximately 7 to 1 is thought to be the minimum requirement for effective ICT-based teaching methods. Research has shown that more sophisticated on-line and collaborative learning may well require transmission speeds at broadband (>1.5Mbps) level. Studies to determine the exact student-to-computer ratio, bandwidth requirements and appropriate transition plans are to be carried out over the next eighteen months.

Of course, providing computers and connecting schools to the Internet is only one element in developing a knowledge-based society – and one that should be relatively transparent to those delivering and receiving education. The true benefits of ICT-driven innovation lie in areas such as curriculum reform, change management, teacher training and content development. To realise these benefits, Government will ensure that computers and ICT-related skills be introduced to children at the earliest possible age and formalised into the general curriculum so that children have to acquire a certain level of proficiency at various stages of their academic development. The *KID Programme*, in conjunction with *SEMP*, will establish educational content and well-defined programmes at each level of the academic system whereby children's achievements and capabilities in ICT can be formally measured and continuously improved. ICT will be introduced as an aid to in-class learning, assist with distance learning and be taught as a subject in its own right.

ICT will be introduced as an aid to in-class learning, assist with distance learning and be taught as a subject in its own right.

Another critical component of the *KID Programme* will be the training of educators so that they have a greater understanding of ICT and can use it both as a classroom tool and as educational content. Over the next eighteen months a major study will be conducted to identify the training needs of educators and to establish a customised training programme to equip teachers with the necessary skills for a more ICT-intensive approach to education.

As the *KID* and *Community Connection Programmes* mature, they will require many thousands of computers to be placed in schools and community centres. The cost of acquiring, upgrading, repairing and replacing these computers and supporting infrastructure could become prohibitive if not managed effectively. The feasibility of government and private sector organisations "donating" surplus computers in support of these programmes, and receiving some form of financial benefit in return, will be closely examined. There are a number of similar initiatives in place in various parts of the world that will provide useful background in this area.

The *Computers for Schools* (*CFS*) initiative has been identified as an innovative mechanism for maintaining computers in schools and *Community Access Centres*. The initiative will create a number of computer repair labs that will refurbish computers prior to them being used in schools and then maintain, upgrade and repair computers that have been used in the school system for some time. These labs could be situated in

various parts of the country, in schools as part of the ICT curriculum, or even in prisons to assist with rehabilitation of offenders.

The labs will provide additional employment opportunities for scores of people and assist in developing new skills that will help grow the country's ICT sector.

SKIE will incorporate a range of initiatives aimed at training and job creation for those outside of the formal educational system – with a focus on the development of skills in adults.

Generating new, and additional ICT skills in the adult population will be addressed in the *Skills & Knowledge for the Information Era (SKIE) Programme*. *SKIE* will incorporate a range of initiatives aimed at training and job creation for those outside of the formal educational system – with a focus on the development of skills in adults. For example, *SkillNet* is a project that will coordinate with existing programmes to create a network of on-line services and tools aimed at helping employers and job seekers use the Internet for recruitment, career, labour information and learning. In addition to the adult training and education offered at *Community Access Centres*, local businesses and private sector training organisations will be encouraged to offer greater levels of ICT training. Major employers and providers of distance learning will work with government to examine the financial and ICT architecture needed for the development of a national life-long learning model for Trinidad and Tobago.

By 2008, the LibraryNet Programme will provide all libraries with computers and high speed Internet access, and all librarians will receive ICT related training.

Libraries play an important role in generating the transition to a knowledge-based society. By 2008, the *LibraryNet* Programme will provide all libraries with computers and high speed Internet access, and all librarians will receive ICT related training. Libraries will be furnished with the same degree of technology, training and support as the *SchoolNet* Project and may be used as *Community Access Centres* in some locations. A number of mobile libraries, equipped with wireless Internet connectivity and computers, will also be introduced.

The *Electronic Heritage Project* will work closely with libraries, curriculum development offices in the Ministry of Education, and local children to capture valuable cultural information in digital form – thereby making it available to everyone regardless of location. A similar project, the *Historical Connections Initiative* will see children and senior citizens working together to develop an on-line cultural record of stories, folklore and genealogy that can be accessed by all. In addition to being fun and capturing valuable historical and cultural information, the *Electronic Heritage Project* and *Historical Connections Initiative* will also help children attain valuable ICT skills for use in the future.

A Sustainable Solution and a Vibrant Future

Increased levels of connectivity offer substantial educational, social, community and cultural benefits for everyone in Trinidad and Tobago. However the country's national connectivity agenda will only be successful, and sustainable, if it results in increased productivity, more jobs and greater levels of investment.

Trinidad and Tobago is well positioned to capitalise on the opportunities offered by the global information society. It is ideally situated to service the needs of the North American market; the general population is well educated; investment sources appear to be available; Government is committed; and the current technical architecture is adequate to meet near-term requirements. If the country moves aggressively, the Internet economy can provide tremendous opportunities for start-up and small companies to flourish, new businesses to be built from the ground up and entire industries to transform themselves for success in the global economy. In many respects, ICT has all of the necessary ingredients to provide T&T with a potential heir to the energy sector which has been so successful in past decades.

Working in partnership, Government and the private sector will explore a number of strategies aimed at accelerating the e-Economy, stimulating economic growth and assisting with poverty alleviation.

The country's drive for increased levels of connectivity in schools, communities and government will result in growth opportunities for local suppliers of computers, software, Internet, installation and repair services and training. These small businesses will feed larger domestic companies, collectively creating many hundreds of new employment positions in the local marketplace. Clear conditions for participation into the liberalised telecommunications sector will provide new entrants with both the confidence and tools to compete and prosper in this expanding market, also providing new business and employment potential.

Increased levels of connectivity in schools, communities and government will result in growth opportunities for local suppliers.

Government will work closely with those in the technology sector, including Internet Service Providers (ISPs), to examine breakthrough business opportunities that could be seized as Trinidad and Tobago takes a prominent place in the digital marketplace. A joint working group will analyse the feasibility and resulting strategies for the introduction of new business areas such as call centres, software development, data processing, computer assembly and technology parks that will arise from increased electronic interaction. Government will also develop strategies for attracting a large ICT "anchor company"

to the country, such as a major software, computer or technology component manufacturer. If the right conditions can be put in place, and a major technology company can be introduced, it will create many more "feeder companies", producing substantial employment opportunities, fast-tracking the evolution of a world-class ICT sector, and significantly expanding exports of ICT related products and services.

Traditional industries can also be strengthened through increased levels of ICT.

Traditional industries can also be strengthened through increased levels of ICT. An *e-Business Roundtable*, comprising leaders from Government, industry and the technology sector will be assembled to provide vision and guidance in this area. The Roundtable will work with various Industry Associations to explore the potential for ICT being used as a catalyst for the further enhancement of foundation industries such as the financial, energy, ship building and repair, port and fisheries management sectors.

Smaller sectors, particularly areas such as tourism, medical training, culture (arts, music, crafts etc.) and exports in flowers, fruits and vegetables seem particularly suited for growth through ICT.

Smaller sectors, particularly areas such as tourism, medical training, culture (arts, music, crafts etc.) and exports in flowers, fruits and vegetables seem particularly suited for growth through ICT. The Roundtable will also work with representatives from these areas to examine how ICT can best be applied.

Government interacts with all elements of society and has a key role to play in accelerating the electronic marketplace and acting as a model-user in Trinidad and Tobago's ICT agenda. Government is the country's largest consumer of local goods and services. As part of its e-Government agenda, the public service will introduce an *e-Procurement* system and start to tender and select more of its products and services across the electronic channel. In addition to realising internal efficiencies for government, *e-Procurement* will encourage the many hundreds of companies who sell to government to move to the Internet and introduce increased levels of office automation.

Promoting Citizen Trust, Access and Interaction through Good Governance

Government is transforming itself for the digital age and is introducing a sweeping reform agenda aimed at improving service quality, reducing red-tape and realising greater efficiencies in the public service. A major *e-Government Initiative* has been established, which will serve as a catalyst to the transformation. Also, a contract has recently been signed to develop the *Government Backbone Project*, which will work towards technically interconnecting all ministries and agencies.

Government will simplify access and service delivery by developing a world-class *e-Government Portal*. The Portal will be designed around the needs of client groups, making the organisational structure of government more transparent to citizens and business. It is envisioned that this one-stop-shop for government services will have three gateways – one for citizens, one for business and one for visitors. Government is striving to make its services available at anytime from anywhere. As well as enabling users to access services from their homes or offices via the Internet, government services will also be available on-line from *Community Access Centres*; kiosks placed in shopping centres and strategically placed terminals located in government offices.

By 2006, all government information will be available on-line.

By 2006, all government information will be available on-line – placing particular prominence on topics such as jobs, education, health, advice for small business, and services that relate to e-business facilitation.

By 2008, all government services that are appropriate for on-line delivery, will be available over the Internet.

By 2008, all government services that are appropriate for on-line delivery, will be available over the Internet. For citizens, early on-line services will include license applications, on-line payments, school registration and passport applications. Early candidates for electronic service delivery to businesses are company registration, tax submissions, micro-credit applications and export advice. Visitors will use their gateway to access information and services on matters such as tourism and investment opportunities.

As government moves more of its service offerings on-line, it will also look towards improving service quality and internal efficiencies by reengineering and standardising its business processes and introducing enterprise-wide technologies such as finance, document and customer relationship management solutions.

A major initiative to train government employees for increased levels of electronic service will be introduced. In addition to teaching technical skills in support of *e-Government*, this initiative will also look at enhancing customer service qualities in staff. This will be particularly important as more transactions become automated and government staff move towards consultative and decision-making roles rather than transactional and administrative duties.

Over the next eighteen months, government will also examine the feasibility of introducing ICT-driven innovation in three key areas. One initiative will examine opportunities for integration between the National ICT Strategy and ongoing Justice and National Security IT

projects. It is felt that increased ICT usage and a common information network connecting the police, courts and correctional systems could provide additional public safety and operational benefits. An *e-Revenue Initiative* will assess the advantages of ICT-led automation and transformation in the area of customs and excise. And an *e-Health Initiative* will study the potential for enhancements in health care service to citizens and lowering the cost for health care providers through increased deployment of ICT.

As well as using ICT for improving public sector service delivery, government also has an important role to play in ensuring there is a clear and stable regulatory and legal infrastructure in place that supports a smooth transition and constant evolution of the country's Connectivity Agenda. As a matter of urgency, a *Legislative Review* will be carried out to examine the suitability of current legislation in supporting new levels of electronic transaction – making recommendations for areas that need to be addressed. The Review will focus on all aspects of legislation, including the current Telecommunications Act; security privacy and data protection; electronic documents and signatures; intellectual property and protection from inappropriate content on the Internet. A *Code of Practice for Consumer Protection in Electronic Commerce* will also be developed.

Additional legal advice and assistance will be required in support of telecommunications liberalisation. In this context, the role of the Trinidad and Tobago Telecommunications Authority (TTTEL) will become increasingly important as the telecom marketplace becomes more competitive and the country assumes more of a prominent position in the global information society. Further investment and support will be provided to TTTEL so that it becomes a fully mature institution and a highly effective regulator.

Maximising the Potential within All Citizens

Trinidad and Tobago's ICT Strategy is truly a national undertaking with roles and benefits for everyone.

Trinidad and Tobago's ICT Strategy is truly a national undertaking with roles and benefits for everyone. Initiatives such as the *Community Connection Programme*, *KID Programme*, *LibraryNet* and *SKIE* will help citizens of all ages establish new skills, which will be of enormous value to them, and our country, as the world advances further into the digital age.

Trinidad and Tobago's young people will play a pivotal role in the ICT campaign. Not only will they be at the centre of our major ICT training and development programmes, but their ability to quickly

understand and adapt to modern technologies will also enable them to be used as trainers and facilitators in assisting other segments of society to understand and use ICT effectively. The outcome will be an ICT literate population, plus the additional development of valuable technical, managerial and interpersonal skills in a significant number of young people.

The *Student Connections Programme* is just one example of how skilled young adults can be used to benefit others. *Student Connections* will place specially trained students from university or community colleges in small businesses or non-profit organisations to assist with the adoption of ICT. The companies will benefit from increased understanding and better use of ICT and the students, who will be paid for their services, will gain valuable job experience. In conjunction with *Student Connections*, a programme of specialised training for company CIOs and senior managers will also be prepared. This programme will help senior business people better understand how ICT and the Internet can be effectively applied as business tools to increase productivity, profitability and organisational effectiveness.

Helping small businesses become e-businesses is a key component of the National ICT Strategy.

Helping small businesses become e-businesses is a key component of the National ICT Strategy. In addition to the training and support that will be offered by initiatives such as the *Community Connection Programme* and *Student Connections*, the *e-Government Portal* will also provide a special area specifically tailored to the needs of small business including practical advice and tools for business start-up, company registration, developing an effective website, using the Internet as a business tool and a service to connect potential buyers and suppliers.

Many small businesses will not have the skills or finances to effectively move their products and services on-line. To address this, Government will assist in developing a highly flexible e-Business application specifically designed for small business. The application will contain storefront, shopping cart, payment and accounting modules and will be accompanied by training software and content. The application may be based on Open Source technologies.

Small Business Centres will also be established in government offices around the country to provide a wide range of advice and assistance to small business owners with special emphasis on e-Commerce.

Accelerating Innovation

If Trinidad and Tobago's ICT Agenda is to maximise its potential, it will need to be accompanied by a sister programme that looks to foster increased levels of innovation and entrepreneurship over the long-term. To aid in this transformation, a *National Innovation Council*, consisting of business leaders, academics, entrepreneurs and top government officials will be assembled and tasked with developing a strategy to increase innovation at all levels of society, to encourage investment and improve quality of life. The Council will also be tasked with identifying tactics to reverse the "Brain Drain" of the country's most talented people to other areas of the world.

Two other specialist bodies will also be formed. An *e-Business Roundtable* of top business people, technology experts and academics will serve as a "think-tank" to guide and challenge the Ministry of Public Administration and Information as it begins the implementation of the ICT agenda. And a *National Infrastructure Taskforce* will be established to ensure there is always a "future-oriented" infrastructure platform under development. This Taskforce will comprise technical experts whose mandate will be to identify and advise on new telecommunication technologies such as Broadband and Satellite. These technologies will become increasingly important over the next few years, as the ICT agenda matures and enhanced infrastructure will be required to support more sophisticated and data-rich ICT applications such as health, education and entertainment. The Taskforce will also advise on topics such as on-line security, Public Key Infrastructure, Open Source Software and standards development.

Other countries have already made significant advances in ICT-led innovation. The Government is exploring the potential of *Twinning Programmes* to learn and benefit from the achievements of world leaders in ICT development and usage. The *Twinning Programme* could include collaborative initiatives such as *Smart Cities*, *Smart Hospitals* and *Innovative Schools*.

Developing a Knowledge-Based Society

Trinidad and Tobago's National ICT Strategy sets out a compelling roadmap for the development of an innovative, creative and entrepreneurial community that will adapt, flourish and prosper in the new global information society. The Strategy is far-reaching and aggressive. It is also thought to be very attainable.

The National ICT Strategy has been designed to benefit everyone in the country. It will provide children from the earliest age with new skills, learning and development opportunities. Education will become more interactive, dynamic and group-oriented. Information will be accessed, shared, refined and turned into knowledge for the benefit of all. Teachers will learn new skills and will apply these skills along with the innovation and imagination of children, and the community at large, to achieve new levels of academic excellence. The ICT Strategy will provide the children of today with the tools for tomorrow.

The ICT Strategy will provide the children of today with the tools for tomorrow.

The ICT Programme will also bring communities closer together. All citizens will be able to use ICT in their everyday lives and will have easy and rapid access to information that is important for their social and economic well being. Families will be able to communicate with loved ones in distant parts of the world, and cultural and historic information will be captured in digital form and made available to everyone, forever.

Young adults will play a prominent role. They will acquire new skills, share these skills with others in the community and prepare themselves for an exciting and prosperous future in the information era.

The Strategy will close the in-country digital divide by providing universal access and offering new opportunities to everyone, particularly those who may otherwise have been marginalised in an "unconnected society".

The Strategy will close the in-country digital divide by providing universal access and offering new opportunities to everyone.

Businesses will be encouraged to embrace the Internet as a competitive and productivity tool. Small businesses will soon become e-businesses and will be able to compete in arenas that were traditionally only open to larger players. Trinidad and Tobago's ICT sector will grow significantly as a result of the country's connectivity program. Larger companies will be able to expand their global reach and new companies, and perhaps entire industries, will be built from the ground up. Investor confidence will continue to grow and thousands of new employment opportunities will be created in a wide variety of disciplines – not only technology but also in education, manufacturing, sales, marketing and administration.

Government will become more responsive, more transparent and more service-oriented. Citizens and businesses will benefit as a result.

However the most rewarding aspect of the ICT Strategy is that it is self-perpetuating. It has been designed to produce a supply and demand cycle that will be created and satisfied by the people of Trinidad and Tobago. The Strategy will kick-start the e-Economy. New skills, ideas and access

to new sources of information and global markets will be generated. This will provide additional enterprise and innovation. Additional enterprise and innovation will result in local employment opportunities that will require new skills and ideas. The cycle will have been completed – a knowledge-based society created.

A Special Role for Tobago

Everyone will have a role to play in the implementation of the National ICT Strategy. Government may need to serve as a catalyst initially, however it is essential that citizens, communities, non-profit organisations and the private sector embrace and adopt the various initiatives if they are to be implemented effectively, and sustained over the long-term.

Tobago has a very important function to play in rolling out the National ICT agenda.

Tobago has a very important function to play in rolling out the National ICT agenda. It is well suited to be used as a pilot site for many of the programmes and projects that will be launched. It is recommended that Tobago be included in some of the early pathfinder projects in programmes such as *SchoolNet*, *LibraryNet* and *Community Connections*. Tobago will be considered as a potential site for a future *Smart Community* and perhaps have its own gateway on the e-Government Portal.

It is felt that the tourism industry in Tobago could benefit significantly from improved levels of ICT. This area will receive specific attention over the next twelve months.

Alignment with Vision 2020

Trinidad and Tobago's National ICT Strategy is a comprehensive, forward-looking plan that will steer the country towards a prosperous future in the new millennium. Although the Strategy has been constructed to focus primarily on maximising the benefits of ICT and national connectivity, it has been designed in a way that complements and works towards achieving Vision 2020 and developed country status.

It has been designed in a way that complements and works towards achieving Vision 2020 and developed country status.

The National ICT Strategy will contribute directly to the underlying philosophies of Vision 2020 in a number of ways, including:

- Improving social equity by providing universal access to an on-line world of information and services;
- Helping people become "information-sensitive" through easy access to the information superhighway;

- Improving education at all levels and increasing science and technological literacy through the application of cutting-edge information and knowledge;
- Creating a competent, productive and sophisticated workforce for the 21st century;
- Sustaining strong economic growth by targeting key economic sectors towards higher value-added activities;
- Providing easy access to quality healthcare;
- Improving accessibility to social services;
- Enhancing consumer education;
- Improving efficiencies and service quality in public sector agencies, and;
- Improving transparency and responsiveness of government.

6. MANAGING THE TRANSITION

Ideas into Action

The National ICT Strategy provides Trinidad and Tobago with a series of logical, and integrated, initiatives. These initiatives will assist in developing new skills and talents, creating economic growth and prosperity, increasing social well-being and cohesion, and positioning the country for ongoing success in the global information society.

This is an ambitious Strategy – with many components. It is important to appreciate that the plan will not be implemented overnight and that its implementation will not be a simple task. There will be many challenges and hurdles to overcome – some expected, some not. As with any strategy, the real measure of success will be how effectively it is moved off of the drawing board and into effect – and how well the anticipated benefits begin to materialise.

It is important to appreciate that the plan will not be implemented overnight and that its implementation will not be a simple task.

The National ICT Strategy is a multi-year, multi-faceted, multi-stakeholder initiative. It is undoubtedly complex, but there are enough examples of successful ICT initiatives in other jurisdictions to suggest that is entirely achievable. The following areas are seen as the keys to success in moving from Ideas to Action:

- Sustained executive leadership – at the highest level
- Clear accountabilities, roles, responsibilities and reporting
- Active involvement and communication amongst all key stakeholders
- Ensuring the various initiatives remain integrated and work towards a common vision
- Approaching implementation in a structured, phased manner to make best use of resources, skills and time
- Using technology wisely, not extravagantly
- Ensuring programme sustainability
- Strong project management skills
- Measuring progress and reporting results
- Regular, honest and open communications
- Risk Management
- Change Management

Moving Forward

Programmes and Projects

The National ICT Strategy describes a series of programmes and projects that will achieve all aspects of the National ICT Vision. In order to move beyond the planning phase, and successfully implement these initiatives, it is important to identify the tasks that need to be undertaken first, the critical dependencies between the different projects and the resources that are required to support each phase of implementation.

The National ICT agenda consists of 14 core programmes, each encompassing a number of projects. Reflective of the integrated nature of the Plan, certain projects help fulfill the objectives of multiple programmes. Implementation of the Plan will begin in 2003/2004 with the roll-out of "Pathfinder Projects" (described below). The objective of these Pathfinder Projects is to establish the technical, organisational, and legislative components upon which the broader ICT agenda can be built. With the "foundation architecture" in place, the roll-out of the broader NICT Plan can commence in 2004/2005, toward the goal of accomplishing most NICT Plan objectives by 2007/2008.

A preliminary list of National ICT programmes and projects, with their estimated funding requirements, objectives, and implementation timing, is shown opposite. Over the next several years, it is anticipated that the implementation of these 14 programmes will require approximately US$82 million in funding. At this point in the National ICT planning process, these figures represent only approximate estimates that are based on similar ICT initiatives being developed in other countries. At this time, they should be used only as placeholders for planning purposes – in the next phase, funding estimates will be refined as more detailed project plans are developed.

It is anticipated that the implementation of these 14 programmes will require approximately US$82 million in funding.

A table featuring summary information on proposed programmes and projects of the National ICT Plan is shown below. Appendix D provides additional information on these programmes and projects.

National ICT Plan: Proposed Programmes, Costs and Timing

#	National Programmes and Projects	Estimated Programme Cost (US$)	Milestone Objectives	Target Dates
1	***ICT Governance***	***$10M***	"Transition Team in place with responsibility for ICT foundation projects"	2004
	NICT Governance Structure			
	National Innovation Council		"National ICT Governance Structure in place with responsibility for achievement of all ICT goals"	2005
2	***Promotion and Awareness***	***$5M***	"All citizens aware of and enthusiastic about the ICT plan and its benefits"	2008
	NICT Promotion and Awareness			
3	***Community Connections***	***$3M***	"50% of homes with Internet access"	2008
	Community Connection Programme		"50% of the population as regular Internet users"	2008
	Youth Computer Corps		"Public access available to all citizens" (within 15 minutes travel)	2008
4	***Knowledge, Innovation and Development (KID)***	***$3M***	"All schools connected via high-speed Internet service"	2008
	SchoolNet		"All teachers received ICT-related training"	2008
	Computers for Schools			
	Teacher Training			
5	***National Archives and LibraryNet***	***$2M***	"All libraries connected via high-speed Internet service"	2008
	LibraryNet		"All librarians received ICT-related training"	2008
	Electronic Heritage Project			
	Historical Connections			
6	***ICT Human Capital Development***	***$6M***	"More than 10,000 ICT professionals employed in the country"	2008
	SkillNet			
	Private Sector Training			
	Student Connections Programme			
	IT Professionals and Senior Management Training Programme			

#	National Programmes and Projects	Estimated Programme Cost (US$)	Milestone Objectives	Target Dates
7	***ICT Sector Development*** Cluster Development "Anchor Company" Strategy ICT Industry Association	***$7M***	"Thriving and innovative ICT industry" "New ICT sector jobs numbering in the thousands"	2008 2008
8	***Growing the e-Marketplace*** e-Business Roundtable Business Modernisation Programme Student Connections Programme Business Gateway	***$3M***	"50% of businesses using the Internet as a business tool, and realizing benefits from it" "New jobs numbering in the thousands"	2008 2008
9	***Public Sector Reform (ICT)*** Public Sector Reengineering Government Skills Development Government Service Centres	***$1M***	"A modern and efficient government organisation, with all Ministries integrated through the use of ICT"	2008
10	***e-Government*** Government Portal - Information Government Portal - Services Government ICT Skills Development e-Government (e-Procurement) e-Government (e-Revenue)	***$15M***	"All appropriate government information available on-line" "All appropriate government services available on-line"	2006 2008
11	***e-Health*** e-Health Feasibility Study	***$3M***	"Plan for improving public health through the use of ICT"	2006
12	***Connecting the Justice Community*** e-Justice Programme National Security ICT Programme	***$10M***	"National e-Justice Plan in place" "National Security Plan utilising ICT in place"	2006 2006
13	***Broadband Strategy & Implementation*** National Infrastructure Taskforce & Strategy Broadband Roll-out	***$10M***	"National Broadband plan in place" "Broadband service to T&T" (>1.5Mbps)	2005 2008
14	***Legislative Review and Reform*** Tax and fiscal incentives Legislative Review Consumer Protection TTTEL strengthening Telecom Liberalisation	***$4M***	"Telecommunications industry open to full competition"	2006
	Total Cost - Five Year Plan:	**$82M**		

Pathfinder Projects

The first year of the National ICT Plan is critical to its overall success. A number of "Pathfinder Projects" have been selected for their ability to accelerate momentum and create a foundation for subsequent programmes and projects. The recommended Pathfinder Projects are listed below; along with brief descriptions of the initiatives.

Description of Pathfinder Projects

ICT Governance

Effective governance of Trinidad and Tobago's national ICT agenda is seen as *the* most critical element in ensuring success. The governance model required to support a national agenda of this scale must be designed in a way where roles, responsibilities and accountabilities are clear and decision-making is both well-informed and prompt. Designing effective governance arrangements for T&T's ICT agenda will be particularly challenging due to the multi-stakeholder and multi-project nature of the programme. In the near-term, it is recommended that a Transition Team be created to launch the Pathfinder Projects and to design the longer-term governance requirements in greater detail.

Effective governance of Trinidad and Tobago's national ICT agenda is seen as the most critical element in ensuring success.

Community Connection and SchoolNet

One of key statements from the NICT Vision is that all citizens will have access to the Internet. The Community Connection and SchoolNet programmes are the vehicles that will ultimately deliver Internet connectivity to every corner of Trinidad and Tobago. However, in the first year of the Plan, more modest goals must be pursued. The creation of a pilot programme, demonstrating the usefulness of Community Access Centres, will provide citizens with visible early examples of the benefits of ICT. The pilot will also help NICT planners to develop the Community Connection model – confirming the process, technology, and management required to implement the sites.

In addition to the connectivity program that will seek to link community centres and schools, the establishment of an ICT scholarship programme, which will annually reward a number of students with scholarships based on identified needs.

Broadband Strategy

The purpose of the National Infrastructure Taskforce is to ensure that there is a plan for addressing T&T s data transmission bandwidth requirements – both now, and in the future. At present, the Internet can be accessed via dial-up or, in certain areas, high-speed connections. Also, the recently approved Government Backbone project may provide the country with additional bandwidth resources. However, mechanisms for monitoring and responding to greater bandwidth requirements must be developed. With the roll-out of the National ICT Plan, Internet usage is expected to increase dramatically, straining existing bandwidth resources. The creation of a National Broadband Strategy will ensure that there are mechanisms in place to ensure these resources continuously exceed demand.

e-Commerce/ e-Business Development

A significant amount of effort will be required to grow the e-Marketplace; however, the success of Trinidad and Tobago s entire ICT agenda is dependent upon the widespread adoption and usage of ICT by the business community. Over the next twelve months, a number of series of small initiatives will get underway to start the acceleration of the e-Economy. An ICT Industry Association will be established to design an ICT Sector development framework and examine the opportunities for cluster development. The e-Business Roundtable will be formed to assist both the ICT Industry Association and guide the overall ICT effort. The Government and private sector will assess the potential for attracting an ICT Anchor Company and the development of ICT related training programmes for SMEs will be developed.

e-Government

The first-year development of the e-Government agenda will serve many purposes. By making useful information and services available via a Government Portal, citizens will have greater motivation to get online. This will help to build a critical mass of Internet users that is necessary in order to make other electronic communications viable. Similarly, by putting certain business-related services online, such as e-procurement and e-customs, industry will finally have sufficient reason to invest in ICT. Giving people sufficient reason to be online, combined with other Pathfinder programs (e.g., promotion and awareness, community access) will undoubtedly have a large impact on the type and volume of Internet usage. Government s role as a catalyst in the development of an e-society cannot be overstated.

Legislative Review

As has been previously identified, much legal and policy change will be required as part of the evolution toward a knowledge-based economy. Deregulation of the telecommunications industry must proceed, electronic information handling rules must be clarified, and citizen privacy and security must be ensured. Recognising that legislative change can be a long and complicated process, it is imperative that work begin immediately on the identification of legislative changes required as a result of the NICT Plan. Once these have been identified and prioritised, the necessary steps may be taken toward reforming legal statutes.

Promotion and Awareness

The overarching goal of the National ICT Strategy is that it becomes an initiative not of government, but of the people. While government is to be a catalyst in beginning the implementation of the plan, ultimately it can only be sustainable if it is embraced and driven by the broader community. For this reason, a national promotion and awareness campaign, educating people on why and how they can use ICT, is so important. This project will utilise the highest quality public communications resources to ensure that the important messages behind the National ICT Plan actually reach their intended audiences. By the end of year one of the Plan, everyone in Trinidad and Tobago will know what ICT is, how it can benefit them, and what they need to do to realise those benefits.

The full scope and detail of the Pathfinder Projects will need to be developed in more detail by the Transition Team before work can proceed. Plans must be developed, funding identified, and key resources acquired in order to get this critical first year of the National Strategy underway. This underscores the importance of ensuring the Transition Team is up and running as quickly as possible, for all other NICT initiatives are dependent on the work of this body.

#	Pathfinder Programmes and Projects	Estimated Cost (US$)	Pathfinder Objectives
1	**ICT Governance** NICT Governance Programme Establish Transition Team Develop NICT Governance Structure Integrate NICT with existing plans Develop detailed NICT Plans	$500k	Transition Team in place with responsibility for ICT foundation projects National ICT Governance Structure in place with responsibility for achievement of all ICT goals Integrated project plans prepared, and project resources identified
2	**Community Access** Connecting Communities Programme Connecting Communities Programme- Phase	$400k	Connecting Communities Pilot Programme implemented in 6-8 sites throughout Trinidad and Tobago
3	**SchoolNet** Knowledge, Innovation, Development Establish ICT Scholarship Programme	$150k	Annual scholarships awarded for study at internationally-recognised ICT institution
4	**Broadband Strategy and Implementation** National Broadband Taskforce Develop Broadband Strategy	$120k	Current bandwidth needs identified, mechanisms for accessing additional access as needed, and plan for implementing
5	**e-Commerce/e-Business Development** e-Business Roundtable e-Business Development	$400k	National e-Business Roundtable created Plan in place for development of the e-Economy Associations created for the study of industry-specific ICT solutions
6	**e-Government** Government Portal – Information Initiative Government Portal – Phase 1	1.1M	Government portal (Phase 1) created, featuring common look and feel, and basic information and services
7	**Legislative Review and Reform** Legislative Review Initiate Legislative Review	120k	Legislative changes related to ICT identified Plan for implementing changes created Legislative and policy recommendations implemented
8	**Promotion and Awareness** NICT Promotion and Awareness Initiate Awareness Campaign	400k	National ICT Promotion and Awareness campaign launched NICT Strategy has national profile and universal awareness
TOTAL COST –1 YEAR "PATHFINDER" PLAN:US$3.2M			

Procurement

Designing and implementing Trinidad and Tobago s ICT agenda will require significant human, technical and financial resources. The initial funding estimate suggests an amount of approximately US$82M will be required to support implementation. Implementation on this scale will require the procurement of a very large amount of goods and services over a period of several years.

Current procurement procedures can be lengthy, and may not be well suited to support an initiative of this magnitude and complexity.

The project Working Groups identified procurement delays as a potentially serious risk to project success. Current procurement procedures can be lengthy, and may not be well suited to support an initiative of this magnitude and complexity. It is recommended that the Transition Team work with the Central Tenders Board to identify streamlined, but robust, procurement vehicles that will better support the

requirements of the ICT programme and still work within acceptable procurement practices.

Governance

Transition Team

Effectively managing the transition to a knowledge-based society is seen as the most critical, and potentially the most difficult, aspect of moving forward – more so than the technical and financial elements of the agenda.

Strong, clear but flexible governance arrangements will need to be established to ensure that the ICT programmes move forward effectively, efficiently and in a highly integrated manner. There are many tasks to be undertaken and there will be roles for all stakeholders. Delegation of tasks will obviously be essential but this must be supported by clear accountabilities and responsibilities to ensure that well-informed and timely decisions facilitate a smooth, and balanced implementation programme.

Detailed governance arrangements are currently under discussion. In the near-term, a Transition Team will be established at the Ministry of Public Administration and Information to oversee and direct the early stages of design and implementation of the ICT agenda. This team will play a major role in establishing initial governance arrangements, staffing key appointments, introducing new stakeholders into the projects, designing ICT procurement arrangements and launching an initial set of Pathfinder Projects . The Transition Team may need to expand once the agenda moves into full gear, however a flexible structure that brings in expertise as it is required is most probably the best way to manage the programme and to make best use of scarce resources.

In the near-term, a Transition Team will be established at the Ministry of Public Administration and Information.

Brief descriptions of the key roles and skills for the recommended functions of the Transition Team are shown below.

(Longer-term governance structure and arrangements are currently under discussion)

Permanent Secretary – Information and Communication Technology

This will be a dedicated, full-time position for a Permanent Secretary. Reporting to Cabinet, through the Minister of Public Administration and Information, the Permanent Secretary will be responsible for all elements of the ICT agenda. In the early stages, a key element of the Permanent Secretary s role will be the liberalisation of the telecommunications sector and the engagement of the major stakeholders as active partners in the country s connectivity agenda. Working knowledge of ICT, a thorough understanding of the National ICT Vision, involvement in telecommunications liberalisation and the ability to work collaboratively to bring diverse stakeholders towards a common purpose are seen as pre-requisites for this appointment.

As the ICT agenda advances, and this position matures, it may be advisable to move the title to National Information Officer or Chief Information Officer . This title may better reflect the role as one of strategic information management, rather than being limited solely to

ICT. The role and title would then dovetail nicely with other similar positions such as Chief Personnel Officer and the Director of Personal Administration.

Legal Division

The Ministry of Public Administration and Information s Legal Division will need to work closely with the National ICT Office. This will be particularly important during the first year or two of the ICT programme as the telecommunications market is opened up to full competition. In addition to providing support and advice to the Permanent Secretary with regards to telecom liberalisation, the Legal Division will also have to create an inter-Ministerial working group for the review and amendment of legislation and policy framework that will be needed to support increased levels of e-Commerce and e-Government.

Communications Support

Effective communication will be a critical component in advancing the ICT programme. A small communication team will be assembled to provide support to the National ICT Office.

Executive Director - ICT

Reporting directly to the Permanent Secretary, the Executive Director - ICT will hold a key appointment and will be responsible for the overall design and integration of all elements of the ICT Plan. Ensuring coordination and managing the critical path of the numerous initiatives will be a full time task and will require the Executive Director to have a detailed understanding of all aspects of ICT, significant experience in large-scale transformational projects and the ability to work collaboratively with a diverse stakeholder group. An effective communicator and leader, this person will need to be able to work at a senior executive level as well as at a project level. It is likely that the Executive Director would be a member of the multi-sectoral e-Business Roundtable that will guide and challenge the evolution of Trinidad and Tobago s ICT agenda. The Executive Director will also closely liaise with the Ministry s Programme Management Section regarding financial management and funding issues.

ICT Policy and Effectiveness

The ICT Policy and Effectiveness Group will examine the ICT-specific policies necessary to enable and enforce the national connectivity agenda. Working closely with MPAI s Legal Division, the group will focus on the major policy areas of the ICT

plan such as telecommunications, economy, life services (health, education, etc.) and community services (social development, community access, justice, national security, etc.). In addition to designing and implementing appropriate policy changes, the Director will also be responsible for developing a performance management schedule to monitor and report of the progress of T&T s ICT programme. This will be a most important role and will require a practitioner experienced in a wide range of policy matters, preferably with expertise in e-Legislation.

ICT Planning and Operations

The ICT Planning and Operations Group will be responsible for the design and execution of the numerous programmes and projects that are to be implemented as part of T&T s connectivity agenda. This function will require a solid understanding of ICT, outstanding project management skills and the ability to work effectively with a broad range of stakeholders. The group will have direct responsibility for the successful design and execution of all ICT initiatives that fall under the Ministry of Public Administration and Information and oversight and integration responsibility for those programmes that are the responsibility of other ministries (trade, health, education, social sector, etc.).

ICT Secretariat

The Executive Director and the ICT Planning and Operations Group will be supported by a small number of staff who will assist with project management, procurement and administrative tasks.

External Assistance

The design and implementation of Trinidad and Tobago s ICT agenda is a major undertaking. Its architects and implementers must be of the highest quality if it is to achieve full success and deliver maximum benefits. It is unlikely that all of these skills will be found in government, or even within the country. If may be necessary to bring in consultants or specialist assistance from abroad. If external assistance is required, it is recommended that these skills be used efficiently and in a way that maximises skills transfer to local professionals. This may require a shadowing programme to be put in place for local staff to work alongside external consultants to accelerate learning and shorten the time required for expensive assistance.

Managing Risk

All projects have elements of risks that, if not managed properly, can seriously jeopardise project success. In order to manage risk it is important to have a clear understanding of what risk is. Risk is the impact of uncertainty or the inevitability that even the best laid plans can be confounded by an unexpected event, false assumptions or human failure. In other words, risk management is about identifying what could go wrong as a result of internal or external events, and planning appropriate actions to prevent or minimise the impact. Experience has shown that risk cannot be totally eliminated from any initiative; however, if managed proactively it can be minimised and in some cases even avoided.

A preliminary risk assessment was conducted using input from Working Group members. The objectives of this assessment were to:

- Identify and describe risks associated with the development and implementation of the National ICT Plan;
- Assess the probability and impact of each risk to determine relative priority and needs; and,
- Develop mitigating actions to help minimise the adverse effects of risk on the NICT Plan.

A preliminary risk assessment was conducted using input from Working Group members.

NICT Plan Implementation: Key Risks and Mitigation Strategies

The key risks to the success of the NICT Plan, and corresponding mitigation strategies, are described below. Each was identified as a high priority issue that needs to be actively managed. Appendix E provides a full listing of project risks and mitigating strategies.

"Procurement process that is inadequate for NICT fails to deliver key resources in timely fashion"

Actions recommended include the creation and utilisation of fast-track procurement and hiring processes for the NICT Plan. Examples of such processes currently exist within Government. Despite using such mechanisms, it was recommended that realistic timeline planning be used as much as possible.

"Lack of project coordination and integration within Government, and between Government and stakeholders, results in project failure"

The establishment of an overarching management body to be responsible for the funding and delivery of NICT programmes and projects was the key recommendation. Toward this goal, there are thought to be some opportunities to build upon existing arrangements involving the Ministries of Planning, Finance and Public Administration and Information. Additionally, as part of pre-planning process for budgets, Ministries and Departments will be encouraged to identify ICT-related projects, using criteria identified by the NICT management body. In general, the creation of robust governance structures for ICT is thought to be the most effective way to prevent project failure.

"Appropriate human resources required for Plan implementation are not available"

The skill sets associated with Strategy implementation must be identified before resourcing plans can be developed. If resources with these skills cannot be found within government, it will be necessary to find ways to attract, develop and retain appropriate persons. Skilled individuals who are very much in demand will need to be appropriately compensated. Acquiring resources from outside the country must not be overlooked, especially when seeking specialised skills.

"Lack of public buy-in and support for NICT Plan limits it to a 'made-by-government' initiative"

A stakeholder analysis and communication plan must be developed that identifies the unique information needs of different segments of the population (e.g., seniors, businesspeople, children, etc.). Using all media, public awareness campaigns must enthusiastically deliver the ICT message. The plan will highlight and celebrate achievements. It will also provide responsive feedback mechanisms to ensure that communication flows both ways. Various elements of the plan must be given to the private sector and local communities for design and implementation. Wide ownership of the plan must be clearly demonstrated and communicated.

"Loss of political support for NICT results in project delays or stoppage"

In order for the NICT Strategy to be successful, it is important that it be driven by grassroots pull . The demands of citizens, groups and businesses for greater ICT development must give the project sufficient strength to overcome political agendas or inertia. In the early stages, this will be achieved by ensuring the public is aware of the real and tangible benefits produced by the project through an effective communication campaign.

Monitoring Progress

Monitoring progress and performance will be of great importance as the national connectivity agenda moves from strategy into reality. Monitoring and reporting is important for a number of reasons, including:

- Demonstrating results, building confidence and accelerating ICT take-up
- Encouraging urgency and momentum in those responsible for programme delivery
- Monitoring the country s progress in terms of global connectivity rankings
- Helping promote Trinidad and Tobago s connectivity agenda on the international stage
- Providing increased visibility of projects that are in trouble
- Tracking financial investment against outcomes
- Assessing individual achievements

As plans for implementing the recommendations of the National ICT Strategy are refined, care must be given to ensuring that the results of the initiative are properly measured and reported on. In recent years, Trinidad and Tobago has actually slipped backward in terms of readiness for the networked world, its ranking declining in relation to countries where ICT planning was more developed. With the release of the National Strategy, T&T has the opportunity to reverse this trend.

Care must be given to ensuring that the results of the initiative are properly measured and reported on.

There are many approaches that can be used to identify national progress in ICT development. A number of high-profile organisations, including the Organisation for Economic Co-operation and Development (OECD) and the World Economic Forum, regularly publish tools for measuring national ICT development, as well as the results themselves. Going forward, monitoring efforts should take advantage of the work of these bodies, and seek to measure T&T s progress using internationally recognised tools. Measures commonly used by these bodies include:

- Number of Internet subscribers
- Broadband penetration rates
- Internet access and use by enterprises by size and industry
- ICT sector contribution to employment growth
- Etc.

Additionally, Harvard University s e-Readiness Assessment methodology has already been successfully applied in Trinidad and Tobago, generating a baseline for comparing future results. It is recommended that a formal measurement exercise using this approach be conducted annually.

At an operational level, project and performance measurement will be carried out by experienced project managers. As part of the ICT governance structure, it is recommended that professional programme management capabilities be utilised by the Planning and Operations Office. It is further recommended that the Policy and Effectiveness Office be responsible for designing a performance management framework for monitoring and measuring progress of the ICT agenda. This feedback will be used to continuously refine and improve programme implementation efforts, ensuring that the ICT agenda is highly responsive to the needs of Trinidad and Tobago and that policy targets are being achieved.

The First Step

As this report clearly outlines, the design and implementation of the ICT programmes and projects will be a major undertaking. It will consist of numerous interconnected components, involve many stakeholders and carry considerable risk. As with any large undertaking, it will be necessary to break the Strategy down into manageable pieces, plan effectively, implement diligently, communicate honestly, manage expectations and monitor progress.

Once the Strategy has been approved for implementation, the immediate next steps are seen as:

- Establishing the Transition Team and identifying personnel for key appointments
- Ramping up communication and awareness efforts
- Engaging key stakeholders
- Clarifying funding arrangements, internally and with IDB
- Designing and launching the Pathfinder Projects

Acknowledgements

Literally hundreds of people have been involved in the development of this plan. A list of participants is shown at Appendix F – apologies to anyone who participated but whose name does not appear for some reason.

Everyone's input has been welcomed, listened to and incorporated into the design of the Strategy wherever possible. There will also be many comments, observations and recommendations that have not made their way into this final report, but it is important to understand that this input has not been lost. The NICT Planning Secretariat has assembled a large file of working documents that will continue to be used as the ICT agenda moves from strategy into design and implementation. Many of the suggestions and ideas that do not feature in this document will undoubtedly be used in subsequent stages of the initiative.

Special acknowledgements must go to the members of the five Working Groups and the NICT Secretariat. Their input, precious time and devotion to the country's ICT agenda has been invaluable. They are the architects of this Strategy and deserve considerable recognition for their contribution.

Thanks are also extended to officials of the Government of Canada, who provided valuable guidance and direction at various stages of the project, and to members of Public Sector Transformation Group (PSTG Consulting) who helped steer the development of the Strategy from concept to conclusion – their knowledge, commitment, energy, and enthusiasm is greatly appreciated.

This has truly been a team effort. The result is a National ICT Strategy that paves the way to an exciting, prosperous and connected future for everyone in Trinidad and Tobago.

As Prime Minister Manning said in his speech to launch the initiative on May 2nd, "let us now move forward….at Internet speed"

Literally hundreds of people have been involved in the development of this plan.

"let us now move forward….at Internet speed".

Appendix A

E-Readiness Assessment

National ICT Strategy Development:

E-READINESS ASSESSMENT

Examining Trinidad and Tobago's Current State of ICT Development

APPENDIX A

A1. INTRODUCTION

"What is e-Readiness?"

e-Readiness is the degree to which a community is prepared to participate in the networked world. It is gauged by assessing a community's advancement in the areas that are most critical to the adoption of Information and Communication Technologies. An assessment of a community's e-Readiness can be used to help the community identify its strategic priorities in using ICT to foster social and economic growth.

e-Readiness Assessment Purpose

The e-Readiness Assessment provides a current snapshot of the ICT capacity in several different areas including:

- Economy and Finance
- Government
- Human Resources
- Infrastructure
- Policy and Legal

This snapshot can be used as a baseline when evaluating the feasibility of desired ICT plans. It is intended to give us an indication of where Trinidad and Tobago is so we can determine what must be done to achieve our goals in ICT. For example, if a significant e-learning initiative is a planned project, but the e-Readiness Assessment indicates that the current network capacity is not sufficient to support such an initiative, then steps will have to be taken to improve the network.

Approach Used

As part of Trinidad and Tobago's National Information and Communication Technology Plan, Working Groups were established for each of five key areas of study: Economy and Finance, Government, Human Resources, Infrastructure, and Policy and Legal.

An international consulting firm, PSTG Consulting, was used to facilitate the development of the NICT Plan, including the Benchmarking and e-Readiness studies. As the foundation of the e-Readiness Assessment, PSTG Consulting provided each Working Group with a focused e-Readiness survey. The surveys contained questions relevant to each area of study. The Working Groups through a combination of consultation, and researching existing reports answered these questions. The results of the e-Readiness surveys have been collected and presented in this Assessment report.

About the "Harvard +" Methodology

What is the "Harvard +" e-Readiness Methodology?
The "Harvard +" e-Readiness Methodology is an instrument of analysis that systematically organises the assessment of numerous factors that determine the Networked Readiness of a community in the developing world. It is based on the well-known tool developed at Harvard University, updated with additional measures of e-Readiness to more thoroughly reflect the current state of ICT development. It examines 19 different categories of indicators, ranking each by levels of advancement in Stages One through Four, with "One" representing a society at the very outset of ICT development, and "Four" representing advanced connectivity.

The methodology does not attempt to identify a total score representing an overall estimation of e-Readiness. It seeks only to offer a starting point in an ICT planning process, and to stimulate discussion on the relative strengths and weaknesses within each category.

The categories are linked, each driving the others, such that a community cannot concentrate solely in one area, but must pay attention to each, noting where it might be able to capitalise on synergies among the categories. Lastly, it is an excellent tool for measuring ICT development progress on an ongoing basis.

A2. ICT Sector Analysis

Infrastructure

The minimum necessary condition for e-Readiness is access to adequate network infrastructure. Without access to global communications networks, no community can participate in the Networked World. Access is determined by a combination of the availability and affordability of use of the network itself, as well as of the hardware and software needed for network interface. The quality and speed of the network are also important in determining how the network is used. The customer service orientation of access providers is a major factor in network application adoption and usability.

Because of the growing importance and unique character of the Internet, which provides a global platform for both data and (increasingly) voice services, the assessment of network access should be carried out in the context of Internet access, rather than access to either voice or data. The significance of the Internet will only continue to grow in terms of global trade and communication.

"Readiness for the Networked World: A Guide for Developing Countries", Center for International Development, Harvard University, 2000

Key Statistics

Approximately:

- 78% of homes have telephones;
- 50% of adult population uses mobile phones (450,000 phones);
- 9% of the population is considered 'regular internet users';
- 417,000 TV sets with 2 to 3 viewers per set;
    - 1.2 TV sets per household;
- 23% of total households has cable TV (82,000);
    - 52% of households has potential access (183,000 households in Trinidad);
    - 50% of households has potential access (6000 households in Tobago)
- 530,000 radios including units in motor vehicles;
    - 1.5 radios per household.

Information Architecture

Many countries that are developing their ICT capacities rely heavily on their traditional telecommunications network. Since more than ¾ of the population has, at least, one house telephone line, a large percentage of the population has the basic information architecture to get Internet access. Most of the population, urban and rural has access to a telephone though it is deemed to be 'easier to get a phone in a rural area than the city'.

Infrastructure: Tobago

As a sparsely-populated island, separated from Trinidad by culture as well as geography, Tobago has a set of infrastructural challenges that are uniquely its own. The islands are currently connected by 4 DS3s. Without the population density provided by having major centres, it can be difficult (and expensive) to install and support ICT infrastructure. Despite this, Tobagonians are getting connected. Communications infrastructure is much improved over the past year (11 cellular sites). Telephone service is generally reliable, and cellular usage is quite pervasive. Dial-up Internet connections are much slower than Trinidad, and modems drop calls regularly. Cable TV is available to 50% of the population from one cable provider; and about 6000 households have the service. Service is only available on the western part of the island.

The cost of mobile phones (TT$600- 6000) seems prohibitively high globally relative to the GDP (TT $45,000). An estimated 50% of the adult population uses mobile phones. If mobile phone plans are affordable then it can be a sustained means of communications.

Greater access to wireless services, however, would reduce the need for continued investment in traditional infrastructure and may offer more competitive rates. In some developing countries, mobile phones have been more accessible to remote populations and these populations have skipped the fixed telephone stage and moved directly to use of mobile phones.

Since a small percentage of businesses have dedicated data lines it is less likely that businesses will make heavy use of the Internet as a medium for conducting business unless a number of businesses dedicate one of their telephone lines for dial-up access. Most companies of the 40,000 businesses, however, have computers and dial up access.

Almost all households have television sets; and about 22% of households also have cable television, with a further 30% having the potential to access cable television. About 6% of households can also

access the Internet via a cable TV connection. Access is more prevalent in more urban areas as opposed to remote ones. Tobago has one cable company; however the service provided is not available throughout the entire island.

Almost all households have radios.

Internet Availability

While one in three has Internet access, only an estimated 9% of the population is considered to be "regular Internet users" (i.e. use the Internet several times a week). Most users focus on e-mail, surfing and browsing. About 20% of Internet users have made an on-line purchase within the last year.

There are an estimated 40,000 businesses with computers and approximately the same number is estimated to have Internet access. However, only an estimated 9% of inhabitants are regular Internet users, which suggests that employed persons do not have access, or do not have reason, to use the Internet at their places of work. There are only limited opportunities for public access to the Internet which appears to be a contributing factor to the limited number of users.

It does appear that dial-up and high-speed access is available across the country though there are some issues around cost. Digital Subscriber Line (DSL) services are available and there is some choice between a limited number of plans. It is a generally reliable service although there are reportedly occasional outages during peak hours. Availability in rural areas is far more limited but improving. High costs would certainly make it difficult for private operators to offer access through establishments such as Internet cafes at affordable prices.

There are approximately nine established Internet service providers in the country. These ISPs offer web-hosting services and according to customer satisfaction surveys, dial-up and high-speed services are fair. With adequate numbers of public Internet centres, increased wireless service solutions, Internet availability in Trinidad and Tobago would reach an advanced level of readiness.

Internet Affordability

Since the country seems largely reliant on traditional telecommunications networks, dial-up access to the Internet is currently most feasible. The cost of telephone installation does not seem prohibitively high and since it is a one-time cost, it should not be a great constraint. For TSTT customers, telephone charges are not limiting Internet access, as calls are toll-free. However, charges are incurred when other ISPs are used, which can be high if the call does not originate within the same charging area as the Point of Presence.

Internet cost is not extremely high (TT $125 for 50 hours of use per month) but in proportion to GDP per capita (~TT$45,000) is not affordable for most citizens. Some packages are available but exceeding the allotted hours results in additional, expensive charges. The average rate of Internet access is very high relative to other neighbouring countries in South and Central America ($81.71USD in T&T versus $54.35 in Venezuela, the highest average rate in any neighbouring country). Competitive rates would facilitate increased use. Further investment in wireless technologies may lower costs and offer more competitive rates.

Affordability may be a significant obstacle to accessibility and an impediment to an advanced state of readiness. About 67% of the population does not own a computer because of high cost. However, among those who do not have access to the Internet, and would want some Internet-related service at a community centre, 76% would be willing to pay $TT10 per hour to access the Internet at a community access point.

Network Speed and Quality

The quality of telephone service is very good with a 98% success rate of calls completion. Maximum dial up speed is 56kbps and ISDN is available at 64kbps. Leased lines for high speed can offer 1.5Mbps but are very expensive. ADSL is available. “Readiness for a Networked World” suggests that an advanced telecommunications infrastructure has fewer than 10 faults per 100 main telephone lines. In Trinidad and Tobago, there is typically only 4-6. There is clearly a need for reduced costs of high-speed access. With improved speeds, at affordable prices,

the country's network speed and quality could easily transition from Stage 3 to Stage 4 of the "Harvard +" e-Readiness Methodology.

Hardware and Software

The fact that only 16% households have computers in spite of their widespread availability is due largely to unaffordable costs of hardware and software. At present, locally assembled hardware is competitively priced but not of the highest quality, and consumers often find it better to use the web as a source. There is minimal locally developed software.

Hardware and software are imported, typically from the United States of America. The hardware and software market is regarded as 'vibrant': products are readily available, in the appropriate language (English), and at global market prices. However, given the country's per capita GDP levels, ICT is unaffordable for much of the population (67%). Only a small percentage of citizens with sufficient purchasing power can afford to buy computers. The lack of affordability is likely the major reason for low usage of computers in homes and possibly, low availability of public access centres.

Service and Support

Customer service is generally perceived to be poor. Problems take a long time to solve. There are a limited number of IT professionals (3,000) in the country, and precise numbers of support technicians are unknown. Web designers are a very small community. The support services industry is growing though, service quality varies widely. In some areas, service is perceived to be quite poor.

"Harvard +" Findings

Information Architecture – Rating: 3.55

- Telephone service is widely available throughout the country – in fact, it can be easier to get a phone in some rural parts of the country than in the city
- With approximately 450,000 mobile phones in the country (+60,000 in the past six months), usage is pervasive
- Cable service is limited to certain parts of Trinidad and Tobago

Internet Availability – Rating: 3.49

- Dial-up Internet access is fairly common, and high-speed access is being made available to more people
- Service is generally reliable, although service outages occasionally occur during peak hours

Internet Affordability – Rating: 2.57

- While telephone service costs are relatively affordable, (particularly residential service), Internet costs are expensive relative to income levels, and are not affordable by a majority of citizens and businesses
- There is little personal ownership of computers likely due to lack of affordability

Network Speed and Quality – Rating: 3.63

- While there is always room for improvement in network speed and quality, Trinidad and Tobago enjoys 98% call completion success, and only six faults per 100 lines – good
- There is growing availability of high speed access (up to 256kbps download speed). Broadband service (>1.5Mbps) is not common
- ISPs have experienced frustration in getting assistance from the incumbent in linking to the local infrastructure backbone

Hardware and Software – Rating: 3.45

- "Vibrant marketplace" – can get hardware and software anywhere, at any time in appropriate language, although there are limited local software solutions

Service and Support – Rating: 2.78

- Improving, but not evenly – service and support quality varies widely

Human Resources

Without an educated, ICT-savvy populace, no community can fully participate in the Networked World. To foster this resource, information

and communication technologies must be incorporated into the learning system. Lamentably, although the use of ICTs in education is one of the

most powerful catalysts to Networked Readiness, it is an opportunity that is often squandered, misunderstood or underestimated.

Readiness also depends upon the community's incorporation of information and communication technologies into the fabric of its activities in order to maximise the gains of joining in the Networked World. In society-at-large, ICTs can have a profound effect upon people's professional and personal lives by providing easier access to information, more efficient ways to communicate and powerful organisational tools. To understand how a community is using ICTs, it is important to assess not only how many members of the community have access to the technologies, but also how they are using them.

"Readiness for the Networked World: A Guide for Developing Countries", Center for International Development, Harvard University, 2000

Key Statistics

Approximately:

- 16% of homes have computers;
- one in three of all age groups has used a computer; with the 15-19 year age group having the highest usage (54%);
- 75% of the population in rural areas lives more than 15 minutes away from public access centres;
- ~3000 I.T. professionals;
- 95% of population view ICT as an appealing career; 2% consider an ICT career not appealing.

Human Resources: Tobago

There are 33 primary schools in Tobago. 13 of these have Internet access, including five to which TSTT provides free access. It is proposed that five additional schools be connected in 2004, but funding needs to be identified. There are currently seven primary schools involved in a pilot project examining ICT use in the curriculum. Eight secondary schools also receive free access.

In general, ICT usage is not as widespread in Tobago as in Trinidad, although there are some notable exceptions:
- Tour operators utilise the Internet as part of their marketing efforts.
- A growing community of expatriate Europeans work virtually from Tobago, forwarding their completed assignments via the Internet.

Schools Access to ICT

Increased IT education in schools will help prepare the population for advanced studies and professional development in ICT fields. There are six hundred and thirty-six schools in Trinidad and Tobago. It is clear that the majority of schools do not have Internet access at this time. Currently some schools, mainly secondary, feature some form of "computer laboratory", and computer courses taught by IT teachers. Secondary schools students taking computer classes receive an estimated two to four hours of instruction per week. However, few schools are equipped with internal networks. Outside of their schools, students living in areas with Internet cafes continue to have regular access.

The Secondary Education Modernisation Programme (SEMP) includes plans to network an additional 81 schools by September 2003. A pilot program for seven schools is currently underway. Generally, the SEMP programme is expected to significantly increase the availability and usage of ICT in schools.

Higher education institutions, such as the University of the West Indies (UWI), benefit from a greater degree of ICT sophistication, including greater Internet access for students, and course-related ICT use.

Currently, there is incomplete information available regarding the level of ICT education included in the general curricula, however the importance of ICT education and training, and its role in ensuring a sustainable connectivity agenda, is widely understood.

Enhancing Education with ICTs

The ability of both educators and students to use technology has a significant impact on building the country's capacity for using ICT now and sustaining it in the future. Currently, educators have little access to networked computers. Outside of 'international schools', educators have a low level of proficiency and, not surprisingly, computer education is not widely integrated into the school curricula. At present, there are no defined standards for professional development that educators are expected to adhere to. Most programs are restricted mainly to secondary school institutions. The SEMP programme is expected to significantly increase the usage of ICT in curriculum preparation and in teaching with ICT.

Developing the ICT Workforce

Employee access to ICT is very low with few individuals having their own PCs, Internet connections and e-mail addresses. While many firms have some form of Internet access (a recent e-commerce survey found that 87% of firms were Internet-enabled), relatively few employees have individual access (9%),. Employees that do have their own e-mail accounts typically work for large firms. The total number of corporate websites is unknown, but is thought to be quite high. However, these sites are typically modest in nature, with limited information that is not updated regularly.

In terms of computer applications, some office automation software is in use. Larger firms have some enterprise application software.

People and Organisations On-line

The literacy rate in Trinidad and Tobago is high for the population over the age of 15: 91.7% for females and 95.5% for males. About 5% of the population has no formal education. Only 35% of the 16 year old students taking Mathematics pass the CXC examinations. While less than 5000 students take science subjects, and only 7% take technology subjects. These are low numbers for the future development of the human capital in the ICT area.

According to a global survey conducted by the World Economic Forum the quality of education is 4.6 on a 7-point scale (7 being equal to the best in world; mean of 4.2) meaning individuals who come through the education system are likely to be adequately prepared to make use of technology and participate in connectivity and the knowledge economy.

The Internet usage is becoming increasingly popular. According to recent World Bank estimates, 120,000 citizens are getting on-line, or 9% of the population. Beyond this, anecdotal evidence suggests that a majority of people, perhaps 75%, is interested in using the Internet. There are many barriers to expanding the total number of people and organisations on-line. While approximately three-quarters of households have telephones, less than 7% have Internet connections. Cost, lack of Internet Service Providers in certain areas, and lack of public access centres are all factors contributing to the low rate of Internet usage.

Locally Relevant Content

The availability of local content is important in addressing local needs and interests, which can help provide people with a "compelling reason" to get on-line. There is currently a general shortage of local community and business Web content in Trinidad and Tobago. Few websites are hosted locally. What local content exists is largely basic information, which is not updated regularly. Among the 120,000 Internet users in the country, electronic communications have proven quite popular, both for domestic and international purposes. With a large number of Trinidadians living abroad, e-mail communication has become a popular method of corresponding with the Diaspora. Individuals who have Internet access make frequent use of it.

ICTs in Everyday Life

The accessibility and affordability of telephones, fax machines, pagers and computers has allowed people in Trinidad and Tobago to incorporate information and communications technologies into their daily lives. 437 per 1000 people have fixed line telephones, which translate to more than 75% of households. This suggests that a large percentage of the population has access to this technology. Furthermore, there are now more than 450,000 mobile phones in use in Trinidad and Tobago. These data suggest that telephones are the most widely used form of ICT.

According to survey data, only 16% of people own personal computers. Usage statistics may be higher, as this figure does not include the use of computers in the workplace. Nonetheless, public Internet access centres could play a vital role in providing access to ICT and integrating their use to enhance daily life. Public Internet access centres are not numerous and confined mainly to urban areas. Tobago is known to have very few. About 4% of the population accesses the Internet through the public library system, and about 5% from schools/colleges/universities. There are about 121 computers in the new National Library in Port of Spain with Internet access for use by the public; and Internet access is also provided at about 25 other library branches. An estimated 75% of the rural population does not have Internet access because most people live more than fifteen minutes away from currently available access centres.

ICTs in the Workplace

The use of ICTs in the workplace is also fairly limited. Although virtually all businesses have computers and access to the Internet via telephone dial-up, a significant number of employees share computers and only a few have personal e-mail addresses for use in the work environment. Government programs, educational institutions and workplaces can contribute to building Trinidad and Tobago's capacity for ICT with training and education. ICT training in T&T is fairly widely available, with an array of courses to choose from, including certification courses in MCSE, A+, Oracle, Cisco, and CIW. Quality of training programs varies. Employer-sponsored computer education is available in an estimated 50% of energy sector firms and 15-20% in other sectors.

There has been considerable growth in Internet-related areas over the past five years. A previous Administration established an incentive programme called "Dollar for Dollar" to assist in tertiary education at the University of the West Indies.

"Harvard +" Findings

Schools Access to ICT Rating: 2.52

- Unknown exactly how many schools have Internet access, but very few, particularly at the primary level

Enhancing Education with ICTs – Rating: 2.86

- Negligible use of ICT in delivering the core curriculum at primary level – more use at secondary and tertiary levels
- Need to train more teachers in primary and secondary levels
- Eagerness on the part of educators to learn to teach more effectively using ICT

Developing the ICT Workforce Rating: 2.90

- Large demand for ICT training, but do not always have career path in mind
- Some ICT training programmes and certifications available but high-cost, low availability, and high drop-out rate
- Low company investment in training – "prefer to hire already qualified"

People and Organisations Online Rating: 3.22

- Less than 10% of the population uses the Internet, and those who do typically use it for e-mail or entertainment

Locally Relevant Content Rating: 2.62

- Few local sites worth visiting – content not regularly updated, cannot compete with traditional means of communicating

ICTs in Everyday Life Rating: 3.38

- Some ICT components becoming more common (e.g. cell phones, pagers)
- Very little incidence of Internet access via cafes, libraries, or other public facilities

ICTs in the Workforce (Government) Rating: 2.45

- Government felt to be lagging behind business

ICTs in the Workforce (Private Sector) Rating: 3.44

- In particular, large businesses (energy, financial sectors) seen to be leaders in ICT investment and adoption

Economy and Finance

Businesses that are able to effectively employ information and communication technologies find more sophisticated and efficient ways of managing their external relationships and communications. This growing ICT usage helps form the critical mass of electronic transactions which supports a networked economy, both in terms of the network size and the demand for associated goods, services, labour and

E&F: Tobago

The tourism industry is more active in Tobago than in Trinidad, and companies in this sector appear eager to embrace ICT. Scotia Bank offers on-line services to the tourism sector, but high initial costs have deterred widespread use. Many operators feature a website with marketing information, with a few accepting on-line reservations.

Some progress has been made in the field of medical transcription services. This involves connecting Tobagonian workers, using voice-over-Internet-protocol (VOIP) technology, to hospitals overseas. Students are trained in the development of appropriate skills by the National Energy Skills Center. Although, this is an emerging field it is estimated that 300 jobs have already been created. It is anticipated that this area would create up to 5000 new jobs.

policy reform.

"Readiness for the Networked World: A Guide for Developing Countries", Center for International Development, Harvard University, 2000

Key Statistics

Approximately:

- 30,000 companies have computers
- 100% of companies have access to telephone lines and ISP service (i.e. they have the technical requirements for Internet service)
- 70-87% of companies have Internet access
- ~0% of businesses offer on-line purchases
- 3,000 ICT professionals in the economy

ICT Employment Opportunities

ICT Employment Opportunities in Trinidad and Tobago are extremely limited, particularly within small- and medium-sized enterprises (SMEs). There are approximately 3,000 IT professionals in Trinidad and Tobago – not a large pool of workers considering the overall size of the labour market. The majority of these people are concentrated in three main areas:

1. IT/telecom services (31%)
2. The public service (19%), and
3. The financial services sector (16%).

Demand is high for specialised IT managers, as evidenced by the top salaries these positions command. The chart below summarises typical annual compensation packages for these roles (all figures in TT$).

ICT Professional Role	Base Pay (Annual)	Total Compensation
Information Systems Executive	~195k – $240k	~215k – $255k
Network Manager	~165k – $215k	~180k – $245k
Information Systems Dev't Manager	~160k – $205k	~175k – $225k
(approximate GDP per capita: $TT45,000)		

Source – Susan Hale of Caribbean Resourcing Centre

However, the vast majority of ICT-related opportunities are in lesser-paying roles such as data entry and simple programming (COBOL, RPG). Skills in "Oracle", a popular database software suite, are also highly desired by employers. Compensation for these roles varies greatly, but is generally a small fraction of that paid for executive ICT roles.

According to local experts, a number of ICT professions are currently expanding in Trinidad and Tobago. These include:

- Telecommunications Equipment and Services
- Data Processing
- Software Development
- Networking Systems
- Database Management
- Internet Development
- Telemarketing, Teleservicing and Call Centres

Some co-operative education placements are available in ICT-related areas. Technology Institute of Trinidad and Tobago, National Institute of Higher Education Science & Technology, and UWI organises these positions.

The Island of Tobago

There is also the danger of brain drain of ICT trained people from Tobago into Trinidad where more attractive and relevant jobs and opportunities are available.

As a result of the limited job market in ICT, a number of highly trained people are seeking employment overseas, leading to a significant "brain drain". Talented IT resources tend to get bored if not challenged, and local opportunities to apply their skills are not meeting this criterion.

Business-to-Consumer (B2C) e-Commerce

The Internet is only beginning to become an important retail medium in Trinidad and Tobago. While the majority of businesses (approximately 70-87%) use the Internet, it is typically for simple uses such as e-mail or research. Commercial websites are not yet commonplace, and electronic commerce still has a long way to go before it is widely available and

accepted. Many companies lack the skills and resources to upgrade their sites to move beyond simple marketing (i.e. basic Web page).

If B2C e-commerce is not highly developed in Trinidad, it is likely in response to very limited demand from consumers. Only a very small percentage of households have access to the Internet and of these, most (62%) use it primarily for e-mail. Since a mere 20% reported using e-commerce transactions, the current demand for e-commerce is very small indeed, with the domestic customer base likely measuring in the hundreds – not enough to sustain a viable B2C marketplace. Of the few consumers who made Internet-based purchases, 79% purchased books and magazines, 65% purchased computer related items, 61% purchased music/movies, and about 23% purchased airline tickets.

The marketplace is further hampered by the lack of widely available electronic payment processing services. The only on-line payment processing capability available in-country is that of Scotia Merchant Bank, which provides these services for some of their key companies.

Privacy and security concerns are another barrier to the widespread acceptance of B2C e-commerce. Among Internet accessible households, 29% of people surveyed were "very concerned" about security, while 36% were "somewhat concerned". Among this same group over 83% feel that new laws are required to protect consumer privacy.

Business-to-Business (B2B) e-Commerce

The only evidence of electronic commerce activity between businesses is the exchange of financial data with the banks, which seem to have the most highly developed electronic transaction processing systems. There is little or no B2B activity within the SME sector. The only integration between front-office and back-office systems exists within two commercial banks, Scotia Bank and First Citizens Bank. There is no sophisticated B2B functionality, such as the integration of supply chain information between buyers and suppliers.

Although B2B e-Commerce holds the promise of greater operational efficiencies, it has not taken hold with Trinidadian and Tobagonian companies, which are reputed to be "closet-like" in the way they treat information. In this environment, communicating through ICT "reeks of

infiltration". This worldview may be a major factor contributing to the low levels of B2B development.

"Harvard +" Findings

ICT Employment Opportunities – Rating: 2.03

- Some demand for ICT skills, but typically for "commodity"-type roles (e.g. COBOL or RPG programming) or entry-level (e.g. data entry)
- Other employers "want one person to do a million (ICT) jobs", (e.g. convert legacy systems while programming in COBOL and managing the website)
- A shortage of IT managers capable of implementing ICT initiatives is seen as an inhibitor to more wide-spread use of technology

B2C e-Commerce – Rating: 2.09

- B2C e-Commerce a low priority for businesses and customers alike – reasons cited include geographic proximity, "no returns" policy, and preference to do business in-person
- There is some prevalence of e-Commerce utilisation in the tourism industry, which focuses on international customers
- In general, the Internet has not been used effectively by companies – those who do have a website do not promote or update it properly

B2B e-Commerce – Rating: 1.69

- B2B e-Commerce has not been widely accepted due in part to companies' reluctance to share information with competitors
- Trinidad and Tobago's main industries, the energy and financial sectors, have made the greatest progress in this area, although little progress has been generally made to date

Government

The primary function of governments is to provide citizens with information and services necessary to maintain a high quality of life. Governments can take advantage of information and communication technologies to improve connections with their constituents, including using the Internet to post information online and to offer interactive services for the public. Governments can also lead by example and become a catalyst for the networked economy by investing in information and communication technologies for their internal use, leading to more efficient operations and the creation of a local market for ICT equipment and services. Relationships with government contractors and procurement mechanisms can be streamlined by putting them online. ICTs can make government activities more transparent to citizens and other observers. They can also enable the government to signal to foreign investors that the country is modern, efficient, and worthy of investment.

"Readiness for the Networked World: A Guide for Developing Countries", Center for International Development, Harvard University, 2000

Government: Tobago

The Tobago House of Assembly website is currently being updated to provide downloadable forms. At present it features only basic information. While there are local branches of government offices in Tobago, service tends to be slow. Certain services still require that one go to Trinidad (e.g. receiving an import license).

It is estimated that 30% of public servants in Tobago have computers.

IHRIS currently in place in Trinidad is scheduled for roll-out in Tobago in late 2003.

Key e-government service opportunities in Tobago include:

- *Any "transactional" services*
- *Tax returns*
- *Assistive "benefits finder" applications*
- *Online company registrations and land registrations*

Key Statistics

Approximately:

- 50% of Ministries have a website
- 25% of Ministries offer downloadable forms
- 0% of services delivered on-line
- 700 unique e-mail identities
- IHRIS, a sophisticated Human Resource Information System is being implemented using PeopleSoft HR
- 1 sophisticated document management system in place at Office of the Prime Minister (OnBase)
- 5% of population would prefer to pay for services via the Internet, compared with 47% who would prefer to do so face-to-face in a one-stop shop. 39% are happy to leave it as is.

e-Government

The Government has made considerable investments in ICT to-date. Some Ministry offices feature modern computer and telephony equipment. They communicate with citizens, businesses, and other Government offices via telephone, e-mail, and the Internet, in addition to face-to-face. An e-Government agenda is being advanced, although not uniformly. There is a need for a comprehensive plan for e-Government, which must be part of the larger agenda for public sector reform.

According to data collected in a recent survey by the Ministry of Public Administration and Information's e-Government Unit, about half of all Ministries feature a Web site. They include Agriculture, Energy, Finance (Head Office and Budgets Division), Legal Affairs, the Ombudsman Office, Public Administration and Information, Tax Appeal Board, Ministry of Labour, and Trade and Industry. (There is also a directory of all government services featured on the Government's main site, but this page is frequently unavailable.) Government Web sites typically feature static information on the Ministry and its divisions, including mandate, services offered, organisational structure, contact information, and "frequently asked questions". It is useful information, accessible twenty-four hours per day, seven days per week, and it does not require additional staffing in order to provide it. This is an example of how Government is trying to meet the needs of its constituents.

While it does not seem to be part of an overall e-Government strategy, certain public service agencies are expanding the scope of their electronic service delivery offerings. The Ministries of Agriculture, the Ombudsman Office, Public Administration and Information, and Trade and Industry are offering electronic forms. Printable forms are available through the websites of the Ministries of Agriculture, Energy, Legal Affairs, Public Administration and Information, Trade and Industry and the Tax Appeals Board. Other Web functions are also available, such as: appointment booking (Energy); downloadable newsletters, publications, and case studies (Ombudsman), searchable library catalogues (NALIS) and viewable vacancy notices (Trade). These Ministries are moving beyond the electronic publication of static data to provide greater client interactivity and more personalised service.

There is still much to do to enable full e-Government in Trinidad and Tobago. Currently, basic information is now accessible on-line. However, ministries do not yet offer highly valuable electronic transactions such as benefits registration, application for training programs, job applications, and electronic payments. The Ministry of Legal Affairs is fairly advanced in having several databases ready for on-line access. These databases include Births, Deaths and Marriages Registry, Land Registry, Company Registry and Intellectual Property Registry.

The next step is to provide broader access to transactional services (see diagram), as part of an overall e-Government strategy. This strategy must be well-planned. Its architects must strive to understand citizens', businesses' and groups' electronic service needs in order to build a plan that is relevant, efficient and effective. Back office systems (finance, data management, human resources) must be assessed for their ability to efficiently support front-end electronic services. Implementation must be timely, but pragmatic. Understanding the current state of government e-readiness is the first step in the development of this strategy.

Government Information Management

Information and communication technology, in the form of modern computers, telephones and network solutions, is pervasive throughout government. However, the usage of electronic systems and processes is still very minor compared with the usage of paper-based ones. Desktop computers may be used to produce documents and presentations, but it is very rare that they are used to access vital data. Most people in government do not have access to a PC. Database servers contain some client information, but more often than not it is as a backup for paper files, not the central record itself. Everything is in paper – there are copies of everything, even e-mail! Although more sophisticated information systems are being introduced, such as IHRIS and document management solutions, their usage is still very restricted.

"Client-centric" Government

The Government of Trinidad and Tobago is starting to more vigorously adopt customer service practices and principles. Service standards are gradually being introduced, accompanied by appropriate service training for employees. While some feel that "Government has passed the state of looking at citizens as customers, and is reorganising itself to adapt to their needs", others note that they "don't think customer service improvements have impacted the general public".

"Harvard +" Findings

e-Government – Rating: 2.59

- Minimal e-Government functionality – even basic information is not regularly updated, there are few forms available for downloading, and there are no online services to speak of
- Little evidence that telephone service is effective – finding the right person to speak to can be very difficult, and even then only limited information is available
- "Never experienced government service other than in person"

Government Information Management – Rating: 1.75

- Have some information on desktop computers, but rules and regulations require that paper copies of all important records be retained
- Little information sharing within and across Ministries
- Document management system implemented for the Prime Minister's Office will be rolled out across government for Cabinet records

Client-centric Government – Rating: 2.00

- A mandate of the Ministry of Public Administration and Information is assisting public service agencies with changing attitudes toward delivery of services
- Some customer service training and standards being introduced
- Customer service improvement initiatives have not yet shown tangible results – the perception is that the public has thus far been unaffected.

Legal and Policy

Public policy can be a help or a hindrance to the networked economy. The favourable climate that public policy can create for Internet use and e-commerce encourages communities, organisations and individuals to invest and use information and communication technologies. Important aspects of networked readiness such as Internet availability, and ICTs in schools, are all influenced by public policy. For a community to become ready for the networked world, the appropriate policy-makers must realise the implications of their decisions upon ICT adoption and use. Proper tax policy can encourage online trade and help enable the growth of electronic commerce, which has the potential to increase the efficiency of enterprises, and the economy, in general. Effective, enforceable intellectual property rights are required in order to catalyse the innovation process in the country. Tax policies, intellectual property right laws (and enforcement), and legal recognition of electronic documents are examples of legal and policy areas of concern to policy makers.

Legal & Policy: Tobago

In Tobago, the issue of 'how and when' to introduce competition to the telecommunication sector is seen as a moot point. Due to the small size of the Tobagonian market, it is unlikely that companies will compete to serve its people. In the end it may be preferable that TSTT continue to serve the connectivity needs of Tobago.

Although not a specific focus of the legal and policy working group, the topic of law enforcement in the digital age is something that Tobago's leadership would like considered. At present, the "E-999" system has the capability to connect police stations, court houses, etc., but these facilities lack the required hardware and software to fully and effectively utilise this functionality.

"Readiness for the Networked World: A Guide for Developing Countries", Center for International Development, Harvard University, 2000

Telecommunication Regulation and Market Structure

The incumbent telecommunications operator is Telecommunications Services of Trinidad and Tobago (TSTT), of which the government owns 51%, and Cable & Wireless Plc owns 49%. TSTT is currently the dominant local telephony carrier. Competition exists in all non-voice domestic services such as Internet, paging, wireless and data. All international voice traffic is currently carried by TSTT. However, international data traffic for several industries such as international energy-sector service companies is connected privately.

The Telecommunications Authority created under Act No. 4 of 2001 is vested with the power to grant concessions for public telecommunications network or service subject to conditions, which include providing the elements of interconnection in a manner that is at least equal in both quality and rates. Consideration is currently being given to the best mechanisms for introducing competition in the immediate future. This matter is being reviewed by the Ministry of Public Administration and Information. A policy framework is under development.

There are several key policy/legal issues that are seen to be inhibiting increased growth and development of ICT:

1. TSTT, through its current dominance in telephone services, appears to be able to constrict competition in the Internet service provider and mobile telephone sectors
2. The Trinidad and Tobago Telecommunications Authority, (TTTel) is an inexperienced regulator
3. The profits generated by TSTT are an important part of government revenues, but in light of government's plan to liberalise the sector, the relationship with TSTT needs to be reviewed.
4. The Copyright and Patents Acts are not actively enforced, which may encourage abuses
5. At present, general consumer protection legislation does not adequately protect consumer privacy and security online
6. Historical lack of Government policy that supports universality of access
7. Lack of a Broadband Policy
8. Internet governance policy is weak. There is no institutional framework for the administration of domain names and a policy to govern disputes in respect of domain names.
9. A policy position has not yet been taken on jurisdictional issues related to ecommerce and Internet taxation.

With regard to policy surrounding universality of access, Section 28 of the Telecommunications Act 2001, when proclaimed, will require the development of a Regulatory framework to facilitate the universal development of telecommunication services. It can be anticipated that through the introduction of this telecommunication "backbone", ICT development will thrive.

In addition to telephone communications, alternative infrastructure, suitable for telecommunications does exist. The Cable Company of Trinidad and Tobago has an infrastructure that is being upgraded to provide Ethernet speeds (10/100 Mbps) using cable modems. The infrastructure is built on a fibre ring that links some key towns. Illuminat and other vendors offer national wireless data services. The electricity distribution company, T&TEC, does not offer telecommunications services.

ICT Trade Policy

Currently there are no incentives to encourage businesses to invest in ICT, however there are no value-added taxes or customs duties imposed on computer hardware and software. Legislation is required to restrict anti-competitive practices. Also, there is need for policies, and a framework, to promote ICT, fair trading and competition policy. Lack of these and the existence of monopolies, further inhibits the flow of investment into the sector.

Enabling e-Legislation

Legislation exists that would enable the sector, including:

- The Electronic Transfer of Funds (Crime) Act 2000 that regulates the transfer of money by an electronic terminal, by use of a card, for the purpose of instructing or authorising a financial institution to debit or credit a cardholder's account when anything of value is purchased;
- The Computer Misuse Act 2000 that deals with unauthorised access, use or interference with computers and other related matters when anything of value is purchased.

A number of policy initiatives are currently being considered that would change existing laws in order to create a climate more conducive to the proliferation of electronic interactions. These include:

- Full promulgation of the Telecommunications Act
- A policy recommendation that neutralises technology-related constraints in existing laws which restrict the legal acceptance of electronic documentation and transactions;
- The Electronic Transactions Bill 2001, which seeks to give legal recognition to electronic documents and signatures

within a regulated framework, (however, it does not make provision for use of electronic payments). The Bill will also limit the civil and criminal liability of ISPs and intermediaries "in respect of any information contained in an electronic record…"

- The Copyright Act 1997, Patents Act (1996) and Trademarks Act, which address IP infringement in the electronic environment, however further amendments are required to cover e-documents.

The National Electronic Commerce Policy Committee Report recommended that "Government encourage the banking sector to introduce an instrument which would facilitate electronic payment for those individuals who would not normally have qualified for traditional credit cards (e.g., a prepaid electronic debit card)". Full implementation of this policy recommendation remains outstanding.

With respect to promoting trust and confidence in electronic transactions, the Report further advocated that "Government adopt a flexible and responsive approach to the protection of personal data, including the acceptance of self-regulatory solutions and enact laws that forbid the disclosure of personal data to other persons unless so authorised by the data exporter". If entrenched in legislation, this recommendation would seemingly provide assurances that personal data could not be used for unethical purposes, (i.e., purposes other than those explicitly stated). This could have significant and positive implications for a population that has yet to fully embrace electronic communications.

"Harvard +" Findings

Telecommunication Regulation – Rating: 2.28

- A single operator (TSTT) providing a wide range of services (e.g. fixed line telephone, cellular telephone, and both dial-up and high-speed Internet) is able to limit competition in those areas
- Plans for telecommunications sector liberalisation are at "the conceptual stage", i.e., they are being considered, and are being treated with top priority

ICT Trade Policy – Rating: 1.33

- Service sectors are not open to trade – domestic regulations create de facto trade barriers
- Telecommunications monopoly has resulted in low levels of foreign direct investment

Enabling e-Legislation – Rating: 2.77

- Various policies pertaining to electronic communications are currently being drafted (e.g. acceptability guidelines for electronic documents)
- Intellectual property in the electronic realm is thought to be protected by existing legislation

A3. CONCLUSION

"Accelerating the e-Economy"

Trinidad and Tobago has transformed its economy once before, leaving behind its agrarian roots to become a significant player in the global energy sector. This wise strategy was properly executed, and it helped usher in a new era of prosperity in the islands. It enabled the development of a modern, efficient public sector. It contributed to a strong educational system. And it helped provide the people of Trinidad and Tobago with a quality of life greater than ever before.

A similar opportunity is at hand today. In order to duplicate this past success, and transition T&T and its people from a resource-based economy to an economy based on knowledge, will require significant effort, investment and commitment. There is a great deal to do to prepare Trinidad and Tobago for the networked world:

- There is a need to improve ICT access, affordability, and bandwidth. A lack of competition in the telecommunications sector (including cellular and ISP) may be a contributing factor. A national broadband policy is required.

- With the exception of telephones, the general public has not embraced the use of ICTs. Fiscal incentives are one possible tool to encourage more widespread adoption of ICT. As a major provider of citizen services, the Government can kick-start ICT development by offering important services electronically and providing public access, giving people and organisations compelling reasons to be online.

- Schools need to be more connected. Educators need to be properly trained to provide instruction using new tools and techniques. ICT needs to be fully incorporated into core curricula at the primary and secondary levels. Hence the SEMP programme must be accelerated so that these objectives can be achieved quickly. Local content needs to be developed and emphasised.

- There is a negative supply-and-demand cycle of ICT use among businesses. There is very little demand for e-commerce, based on low Internet usage, lack of interaction between firms, and cost barriers to ICT investment. Employers, who do not see it as a priority, do not extensively use ICT. Firms will have to adopt ICT in a more meaningful way if skilled workers are to be encouraged to seek appropriate opportunities in this country. For the T&T economy to realise the benefits of ICT, these trends must be reversed.

Fortunately, Trinidad and Tobago is blessed with many favourable qualities when it comes to ICT. These strengths must be leveraged in order to accelerate the e-economy, and develop the knowledge-based society:

- The country has a good telephone infrastructure, with reasonably good availability, speed and quality. Dial-up Internet access is fairly reliable, and accessible, but its price structure must come down – it remains too expensive for adoption by the general population.
- A strong educational system has created an informed, communicative population that is prepared and eager to learn. Much work has already been begun in introducing ICTs to schools, but these efforts need to be expanded upon.
- There is a modern, effective government that reliably provides services to citizens and businesses. Public sector modernisation projects are already underway. Sustainability remains the watchword when it comes to ICT.
- Policy and legal frameworks have laid the groundwork for sweeping changes in how ICT is managed and used.

In many ways, Trinidad and Tobago resembles the typical “small-island developing state”, with its considerable network build-out, competition issues, and gap between the technology “haves” and “have-nots”. Despite these challenges, the country is well positioned for advancement into the next tier of network ready countries. The development of the National ICT Vision and Plan is a bold step in that direction. Certain actions can be taken in the short term to accelerate the realisation of this Vision.

This assessment of the current state of networked readiness in Trinidad and Tobago suggests three initial strategies that, if adopted, could help to stimulate ICT use among the general public, and accelerate the e-Economy.

1. Facilitate Improved Access and Affordability

This can be achieved using a series of tactics including:

- Providing financial or other incentives for individuals or companies looking to acquire, or donate, computers
- Providing increased numbers of community access points for individuals who cannot afford computers in the homes
- Encouraging increased levels of bandwidth from service providers
- Introducing increased levels of competition into the telecommunications sector to encourage a reduction in price and an increase in service and quality

2. Increase Promotion, Awareness and Education

Even with improved access, additional bandwidth and a reduction in costs, Trinidad and Tobago will still need to invest in a wide-ranging program to make citizens and business owners aware of the benefits of increased connectivity, promote ICT usage and prepare the general population for life in the global information society. A comprehensive educational strategy will need to be developed that examines areas such as:

- ICT content and curriculum for all levels of education – including adult training
- Future skill development requirements for ICT professionals
- Teacher training and development
- Enhancement of the library network
- School connectivity requirements
- Computers for Schools
- Measures and incentives to address the threat of the Brain Drain
- Sensitisation for those less familiar with modern technology

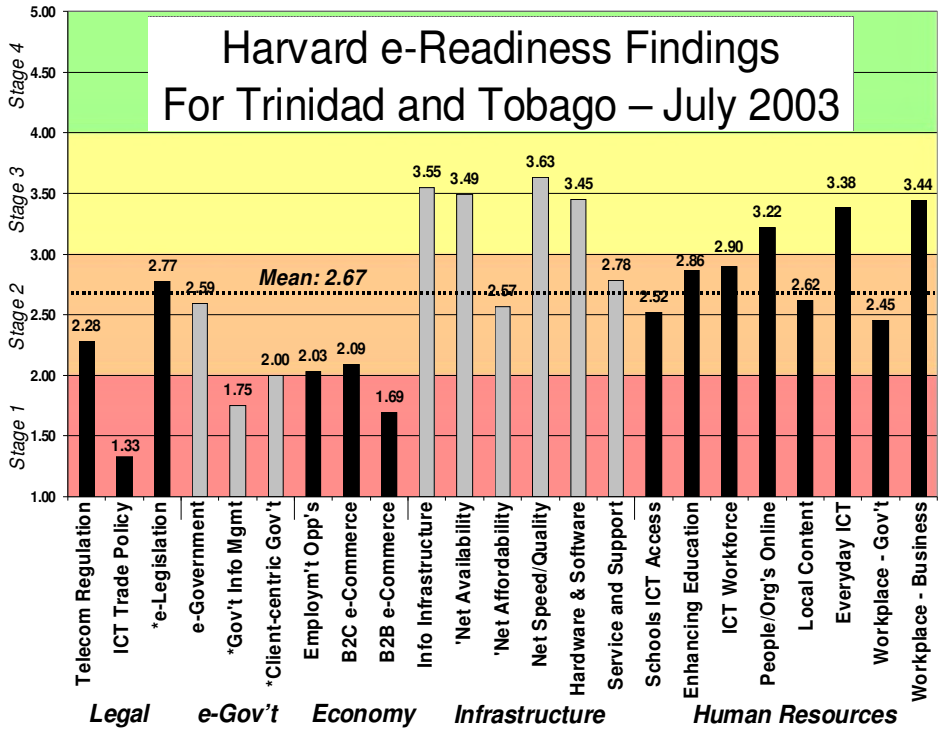
3. Acceleration ICT Programs, with Government Taking the Lead

There are a number of ICT related programs planned or currently in their early stages. Hopefully, Trinidad and Tobago's National ICT Strategy will serve as a catalyst to accelerate these programs into implementation. Government "touches" all elements of society in Trinidad and Tobago and will play a pivotal role in stimulating ICT take-up and sustainability. In addition to providing enabling legislation and appropriate fiscal incentives, a well designed e-Government strategy can assist by providing value-added, and tailored electronic services to both citizens and businesses.

Epilogue: *"Harvard +" Findings*

The application of the "Harvard +" methodology was a highly productive exercise that generated meaningful discussion in each area of analysis. e-Readiness workshop participants had the opportunity to debate what they felt were the "real" issues behind Trinidad and Tobago's connectivity progress, or lack thereof, and assign each area a numeric score from 1.0 to 4.9. The quantitative results indicate that while some areas are in the very early stages of development toward networked readiness, others are showing signs of advanced e-readiness. For example, infrastructure components rated highly on the "Harvard +" scale largely due to the pervasiveness and quality of telephone networks. These same networks are being used to support domestic Internet usage that, while unaffordable by many, is available and reliable in most parts of the country. At the other end of the spectrum, ICT Trade Policy, e-Commerce and e-Government were areas identified as needing significant improvement.

The Government now has a baseline of e-Readiness information. This exercise will be repeated on an ongoing basis, either annually or semi-annually, so that e-Readiness progress from ongoing ICT initiatives can be measured.



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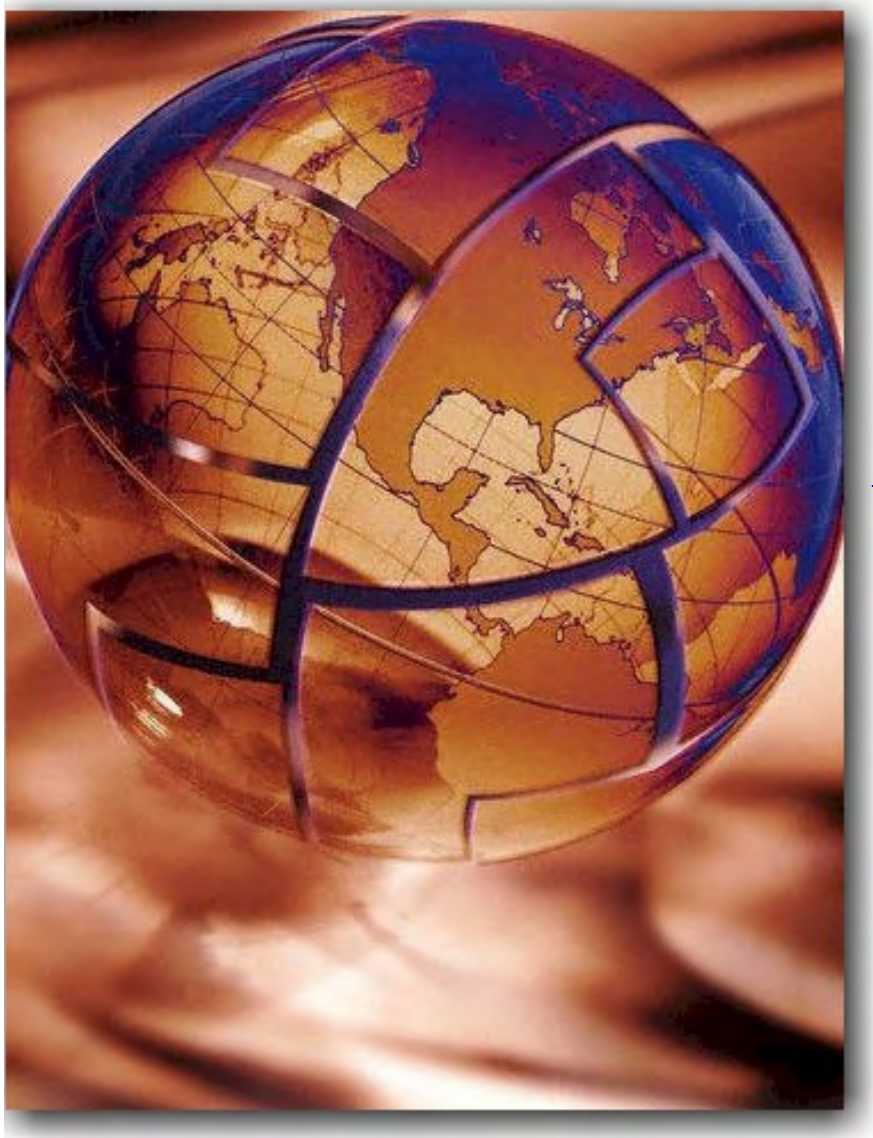
Appendix B

National ICT Benchmarking Study



National ICT Benchmarking Study

Trinidad and Tobago versus
Selected Comparator Countries

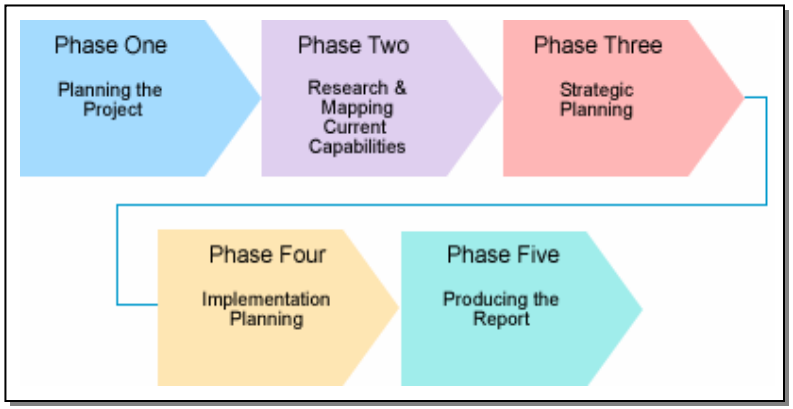
Appendix B

Introduction

The National Information and Communication Technology (ICT) Plan

The Government's Vision to bring Trinidad and Tobago to Developed Nation Status by 2020 recognises that development in the ICT sector is critical to achieving this goal. Thus in order to foster ICT development, the Government commissioned the creation of a National ICT Plan, the intent of which is to provide real, lasting improvements in social, economic and cultural development through the development and use of information and communication technology, and to establish Trinidad and Tobago in a prominent position in the global information society.

The National ICT Plan will be produced using a five-phase process (see diagram at right). Phase One saw the creation of the project working structure, and confirmation of the project plan. Phase Two is concerned with the identification of Trinidad and Tobago's current ICT capabilities, which represents the "starting point" for developmental planning.



Phase Two is comprised of two major components:

1. An assessment of the country's state of electronic readiness.
2. A benchmarking study comparing Trinidad and Tobago's e-readiness with other nations.

Study Objectives

The objective of the Benchmarking Study is to understand the level of ICT development in Trinidad and Tobago relative to various comparator countries. When combined with the "e-Readiness Report", which examines in absolute terms Trinidad and Tobago's progress in five key areas of ICT development, a comprehensive picture of the "current state" of ICT emerges. The objective of this study is not to identify absolutes such as "most connected country". Rather, the intent is to gain a better understanding of Trinidad and Tobago's performance in ICT development relative to selected comparator countries, as well as the broader international community. Documenting the current level of development accomplishes two things. First, it allows for the design of initiatives that are tailored to Trinidad and Tobago's specific needs, focusing effort on those areas that need it most, and that will provide the greatest impact. Additionally, it identifies a starting point against which developmental progress can be measured.

Introduction

Approach Used

The Benchmarking Study began with the selection of countries whose ICT characteristics were to be compared with those of Trinidad and Tobago. Generally speaking, ICT development can be examined in five key categories:

- Infrastructure
- Human Resources
- Economy and Finance
- e-Government
- Policy and Legal.

These categories are consistent with those used for the e-Readiness assessment, and for the development of the National ICT Plan. Within each category are key indicators of ICT progress, e.g. within Infrastructure, "broadband availability" is a key indicator; within Human Resources, "public spending on education". (For more information on these categories, please see the "e-Readiness Assessment Questionnaire.")

Using a variety of reliable international data sources (see box at right) an array of objective and subjective data were collected within each category. The data for each country were charted and compared against one another, and analysed for any insights, correlations, or implied causation. The results reveal each country's level of ICT development in each category relative to the selected comparator countries. The data collected also include world rankings in ICT from recently published international studies.

The results of this draft study were validated with stakeholders from the five key categories (see above) prior to being published. The final results of the Benchmarking Study can be combined with the findings from the e-Readiness assessment to present a comprehensive view of the "current state" of Trinidad and Tobago's ICT development progress. This information identifies the areas of greatest need (and greatest accomplishment) at this point in time, enabling the prioritisation of initiatives, and providing a baseline against which future development progress can be measured.

Sources Used

The sources used in this Benchmarking Study include the following:

1. The World Economic Forum's "Global Information Technology Report: Readiness for the Networked World (2002 and 2003 editions).

These reports represent the most comprehensive study of global ICT development attempted to date. They feature ICT development data on over sixty key indicators for every country in the world (with greater than 1 million population). Data include survey results from global Executive Opinion Surveys conducted in 2001 and 2002, and hard data collected from a variety of sources, including the ITU database, the World Bank *World Development Indicators*, the IMF *World Economic Outlook*, UNESCO Institute for Statistics, the International Telecommunication Union (ITU), and the World Information Technology and Services Alliance (WITSA).

2. The World Bank's "Worldbank.org" website, featuring "Country at a Glance" and "ICT at a Glance" tables (2001)

3. The International Telecommunications Union's "World Telecommunication Indicators Database" (2003).

4. CIA World Factbook (2002).

A full listing of the data used in this study is available in the Appendix.

General Country Information

Selecting appropriate countries to compare with Trinidad and Tobago is a difficult task. All but one of the countries included in this study – Costa Rica, Ireland, Jamaica, Mauritius, Malta and Singapore – are small island nations. All have populations between one and roughly four million people. Two of these countries are Trinidad and Tobago's Caribbean and Central American neighbours. Others are separated by geography, as well as socio-economic development progress. There are various reasons for selecting these countries for inclusion in the Benchmarking Study:

Costa Rica is a small, Central American country with development challenges similar to Trinidad and Tobago's. In recent years, Costa Rica has become well known for its progressive policies toward high-tech investment. However, its appeal as a base for technology companies belies internal challenges such as lagging telecommunications policies and substandard ICT access.

Through low customs tariffs, tax holidays, and reinvestment incentives Costa Rica has attracted investment from several foreign-owned ICT companies. Intel, Microsoft, Motorola and other international firms have Costa Rican facilities. There are several objectives behind these policies, such as increasing opportunities for local ICT industries, and improving overall economic development.

Ireland is regarded as one of the recent success stories of Europe. Historically a relatively poor economy, Ireland has achieved significant growth by investing in education, and utilising appropriate information and communication technology. Heavy government spending on technical and tertiary institutions in the early 1980s led to a steady supply of highly skilled workers. Tax and trade regulations have created a welcoming environment for ICT companies.

Benchmarking Study Comparator Countries:

While our sample of seven countries are all similar in terms of population, income disparities separate them into groups of more developed (Singapore and Ireland) and less developed countries. The effects of this disparity may be realised in other areas of the study.

In 2001, Ireland completed a rollout of a national fibre-optic network to more than 120 towns. They also recently liberalised Eircom, the incumbent state-owned telecommunications provider. Furthermore, the e-Business Act was passed in 2001, creating legal support for online transactions and digital signatures.

General Country Information

While **Jamaica** began ICT planning two years ago, continuing economic problems have hampered its overall development. With low levels of per capita income, in-home Internet connectivity is impossible for the majority of citizens. Jamaica has set in motion the liberalisation of its telecommunications sector, and they are well into Phase 3 of their effort. Currently, high costs of local and international long-distance telephone service, as well as Internet access, are inhibiting usage by citizens and businesses. A shortage of local and international bandwidth stifles private sector ICT growth. Recent turmoil and violence in Jamaica have had the effect of deterring foreign investment in the island.

With similar population, income, geographic and cultural features to Trinidad and Tobago, **Mauritius** is often used for comparison purposes in benchmarking studies. The growth and stability of the economy over the past two decades has had a remarkable effect on the society. The government is trying to accommodate the needs of foreign ICT companies. A Green Visa concept for ICT professionals has had some success in attracting ICT workers from other countries. Interestingly, IBM has established a regional headquarters in the country.

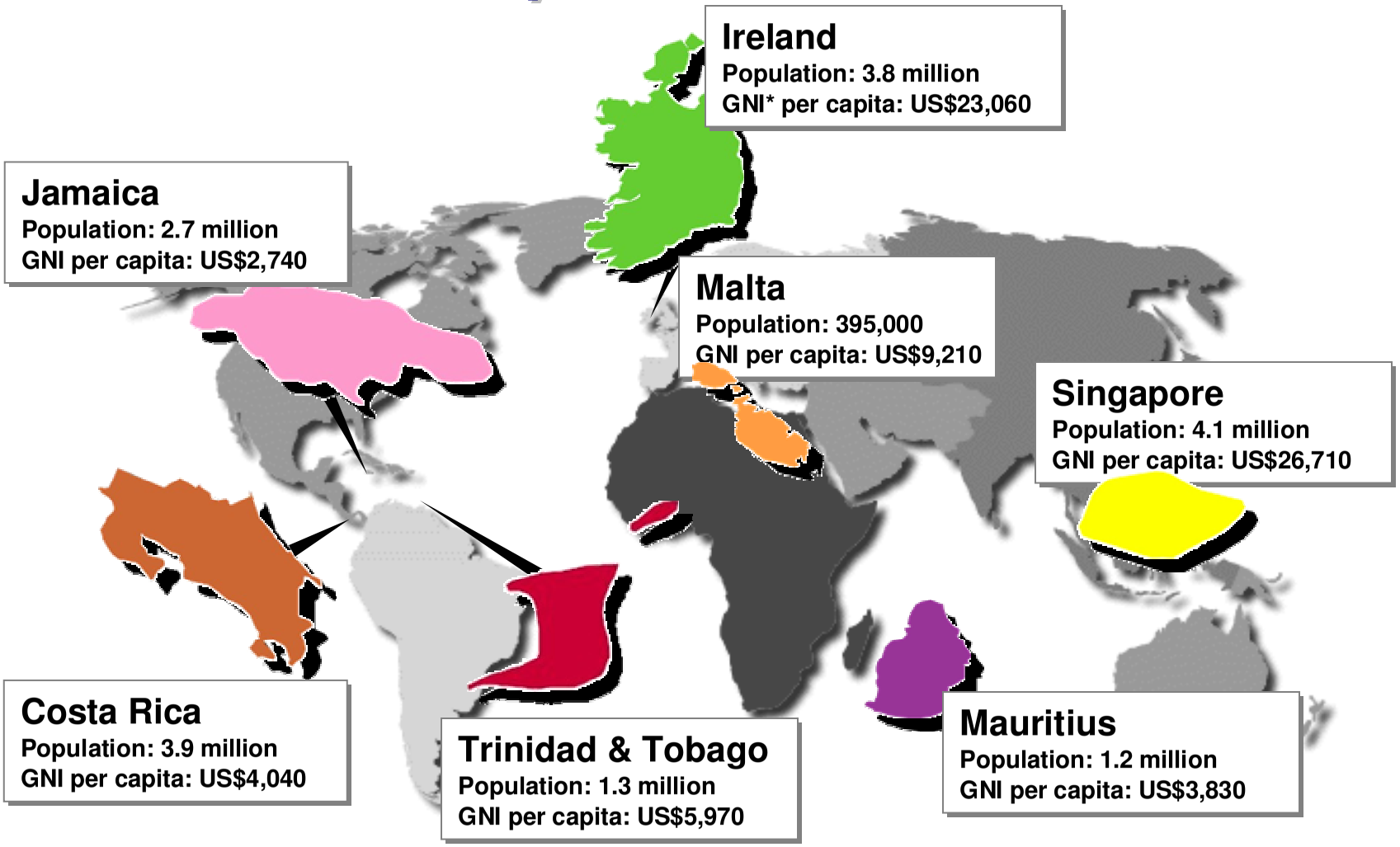
Singapore, although a small island with no appreciable natural resources, has achieved remarkable wealth through innovation and technology development. It has been able to exploit its small and literate population, innovative private sector, and efficient government to make ICT a key stimulus to economic growth. Foreign ICT companies are attracted by Singapore's favourable legal environment, stable politics, and strategic location. Heavy investment in ICT infrastructure has been the hallmark of the Singapore government since the mid-1970s. Singapore remains one of the most ICT-savvy societies in the world.

On the following page, it is revealed that Ireland and Singapore have significantly higher levels of income than Trinidad and Tobago, as measured by Gross National Income (GNI) per capita. This does not exclude them from the remainder of the study. However, it should be noted that, in previous studies, income has been found to be a strong predictor of ICT development levels. It should not be surprising then, if Trinidad and Tobago is found to lag behind these countries in general terms. It is important that the benchmarking study be realistic in assessing Trinidad and Tobago's relative level of development. It is also important to look beyond macro indicators to consider how well Trinidad and Tobago is doing in specific areas. This will allow for the creation of a detailed, pragmatic plan that addresses Trinidad and Tobago's specific needs.

The Republic of Malta

The island nation of Malta was originally considered for inclusion in this Benchmarking Study. Its size, proximity to major markets, and cultural diversity makes it an interesting comparison to Trinidad and Tobago. Additionally, Malta is known for having achieved considerable success in ICT development. However, with a population of only 400,000 Malta is sometimes excluded from global ICT studies. Lacking complete data in the five areas of ICT analysis, it was necessary to omit Malta from direct comparison with the other benchmarking countries. Instead, where information is available, a profile of Malta's progress in ICT development is presented.

General Country Information



Source: Worldbank.org Country at a Glance tables, 2001

Note: Country representations not to scale

* GNI Gross National Income

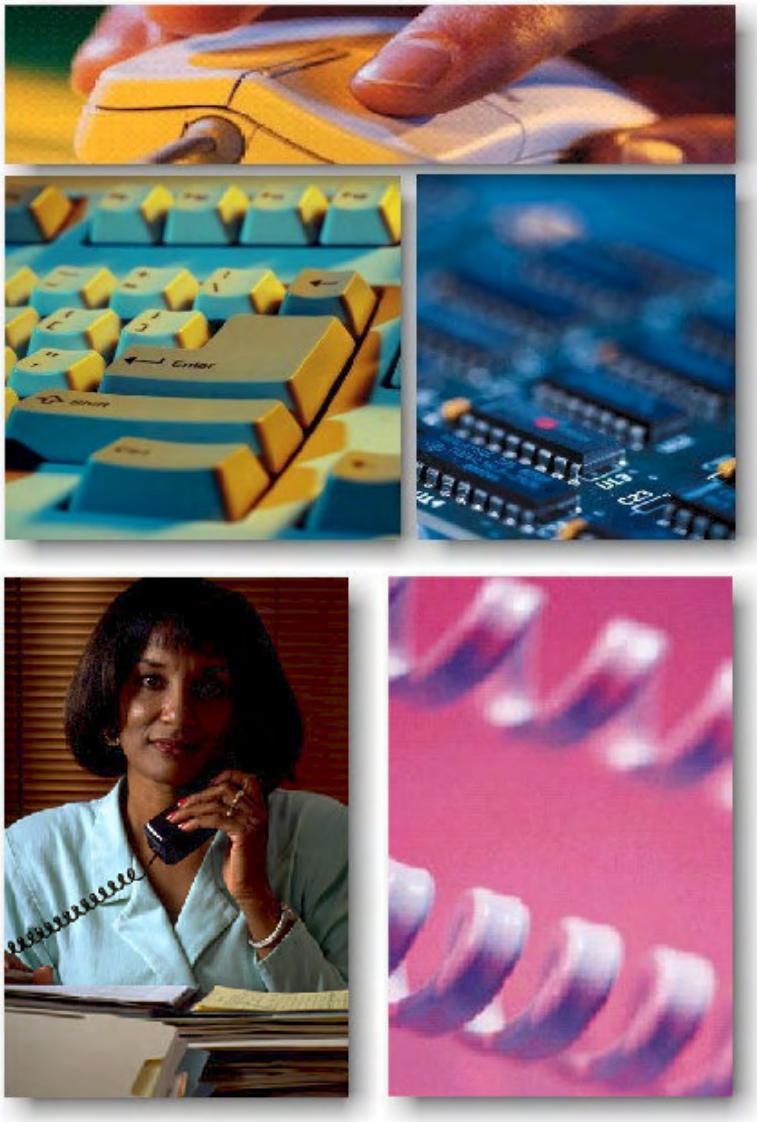
Infrastructure Comparison

About Infrastructure

The minimum necessary condition for connectivity is access to adequate network infrastructure. Without access to global communications networks, no community can participate in the Networked World. Access is determined by a combination of the availability and affordability of using the network itself, as well as of the hardware and software needed for network interface. The quality and speed of the network are also important in determining how the network is used. The customer service orientation of access providers is a major factor in network application adoption and usability. Because of the growing importance and unique character of the Internet, which provides a global platform for both data and (increasingly) voice services, the assessment of network access should be carried out in the context of Internet access, rather than access to either voice or data. The significance of the Internet will only continue to grow in terms of global trade and communication.

Key Measures:

- Telephone Cost and Usage
- Internet Usage
- Internet Access Cost
- National ICT Expenditure
- Infrastructure Quality
- Broadband Availability
- Telecommunications Sector Competition
- Telecommunications Competition and Price



Infrastructure Comparison

Telephone Cost and Usage

	Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore	Malta
Source: International Telecommunication Union (ITU) "World Telecommunication Indicators Database" (2003)							
Business telephone connection charge (US$)	22	50	112	18	69	17	102
Business telephone monthly subscription (US$)	28	6	16	16	3	7	10
Residential monthly telephone subscription (US$)	5	5	16	7	2	5	4
Residential telephone connection charge (US$)	11	50	112	13	34	17	51
Total telephone subscribers per 100 inhabitants	44	31	126	45	48	120	114

Figure 1. Telephone Cost and Usage

For most people, the telephone is the simplest and most affordable means of communicating interactively over long distances. For this reason, the affordability and accessibility of telephone technology is an important measure of a country's ICT development. In addition to being a tool for voice communication, telephone networks can also be used for the transmission of data over the Internet.

Trinidad and Tobago has an average number of telephone subscribers per capita, based on its income and general development level, being roughly on par with all surveyed countries except Ireland and Singapore. It is not surprising that telephone usage is fairly widespread in Trinidad and Tobago, as both residential and business connection charges seem affordable when compared with others, especially since its GNI per capita is higher than Costa Rica, Mauritius and Jamaica. Monthly residential subscription charges are also affordable, although business rates seem relatively expensive.

On the whole, telephone usage in Trinidad and Tobago is equal to or above that of its nearest competitors, but far below that of more developed countries (Ireland and Singapore).

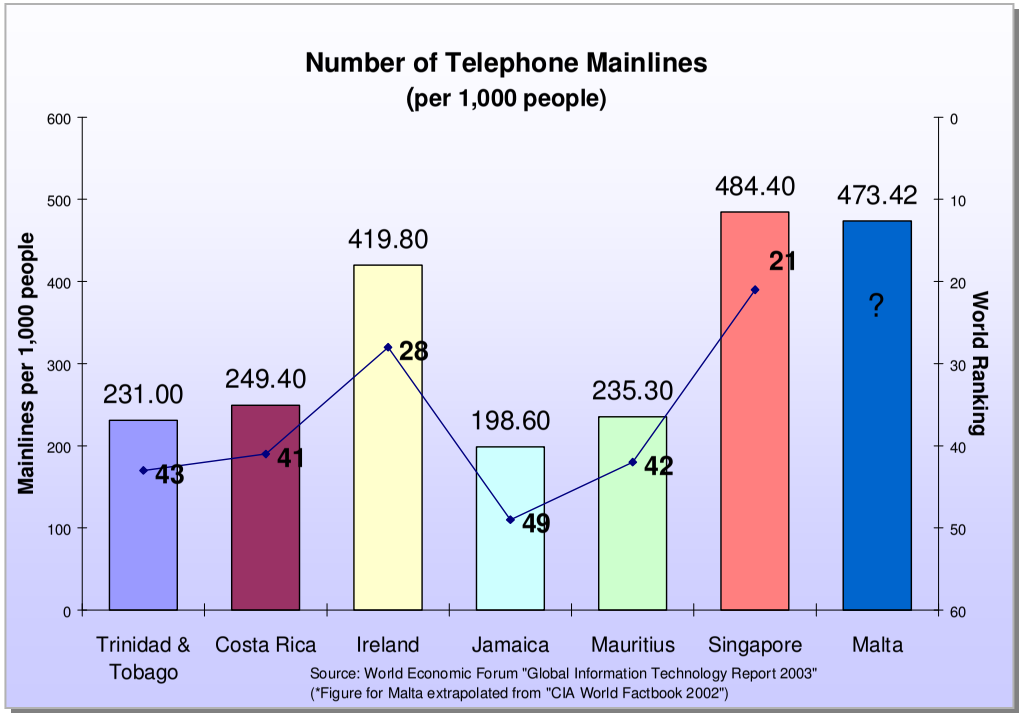


Figure 2. Number of Telephone Mainlines

Infrastructure Comparison

Internet Usage

Singapore has a much greater number of total Internet users than the other countries. This is not surprising, considering it has the largest population, and the highest per capita income. When we examine the number of Internet users per capita, the scenario hardly changes. More developed countries like Singapore and Ireland have realised a much greater take-up rate of Internet use among the population. As a result, any Web-based initiatives that are introduced have a much broader impact, (and chance of success), as they are accessible by a greater proportion of the population.

How do these figures compare in the global context? In terms of public access to the Internet, which includes post offices, libraries and community access centres, Trinidad and Tobago ranks 55th out of roughly 82 surveyed countries*, ahead of only two of the benchmarked countries, Jamaica and Mauritius. If Trinidad and Tobago hopes to include more of its population in the ICT revolution, clearly public Internet access needs to be extended.

Source: ITU "World Telecommunication Indicators Database" (2003)

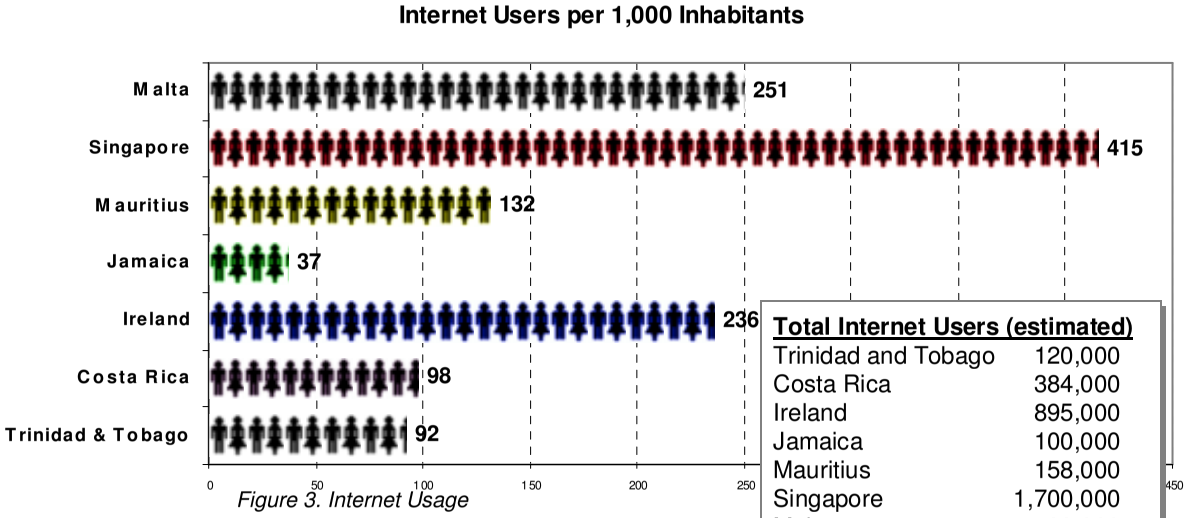


Figure 3. Internet Usage

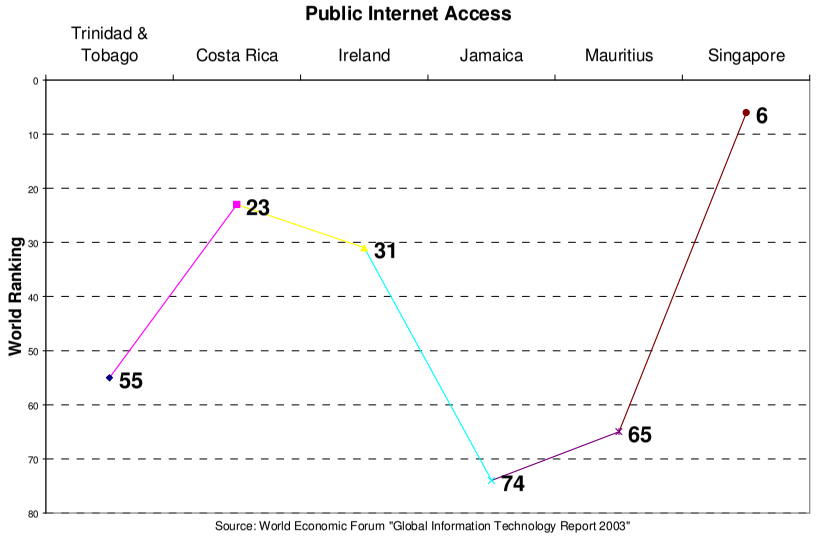


Figure 4. Public Internet Access

* The World Economic Forum survey examines countries of greater than one million population, plus Iceland. Thus for the 2002 survey, 75 countries were sampled; for the 2003 survey, 82 countries.

Infrastructure Comparison

Internet Access Cost

Cost is frequently identified as a major determinant of Internet accessibility and usage. The chart at right indicates that Trinidad and Tobago is in the middle tier of countries in terms of the *affordability* of Internet access. Although Internet access is not exorbitantly priced (approximately $125TT for 50 hours), it is expensive in relation to the country's per capita income levels.

National ICT Expenditure

This measure refers to the expenditure associated with acquiring the ownership of telecommunication equipment infrastructure, including supporting land and buildings, and intellectual and non-tangible property such as computer software. In terms of national spending on information and communication technology, most countries included in this study fell within a fairly narrow band, spending between 6.22% and 6.70% of GNI. However Singapore, already a world leader in connectivity, invested 9.70% approximately US$400 million, in order to ensure it remains at the forefront of ICT development.

	National ICT Spending, 2002
Trinidad and Tobago	US$110,112,000
Costa Rica	$233,062,000
Ireland	(figures not available)
Jamaica	$137,370,000
Mauritius	$66,323,000
Singapore	$370,112,000
Malta	$31,111,000

Figure 6. National ICT Spending

Source: International Telecommunication Union (ITU) "World Telecommunication Indicators Database" (2003)

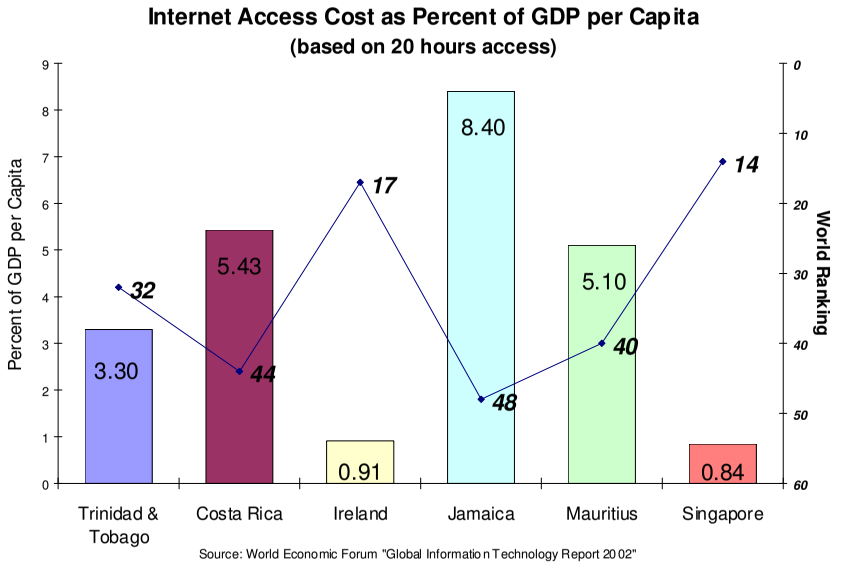


Figure 5. Internet Access Cost as Percent of GDP per Capita

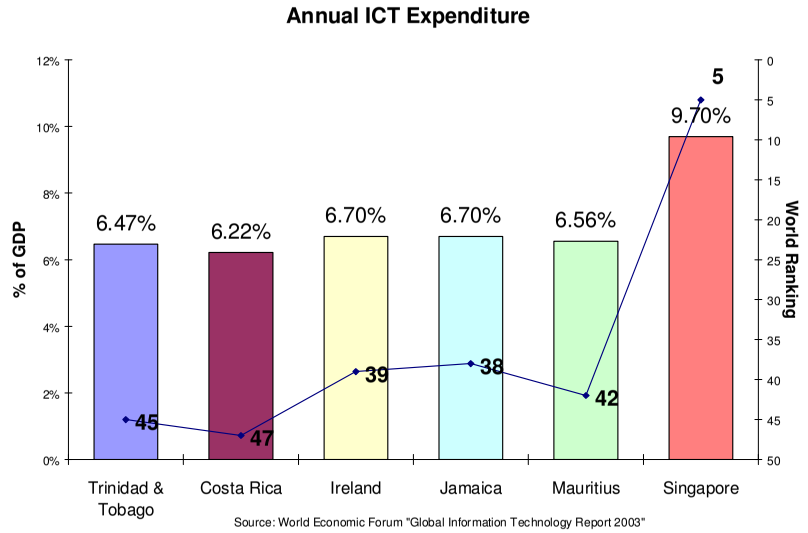


Figure 7. Annual ICT Expenditure

Infrastructure Comparison

Infrastructure Quality

In terms of overall infrastructure quality, (a fairly broad term), Trinidad and Tobago ranks highly compared with local countries (Costa Rica and Jamaica), and competitively with certain others (Ireland and Mauritius). Only Singapore has made greater efforts to ensure the quality of their infrastructure. This is an encouraging indicator of Trinidad and Tobago's preparedness to advance with its ICT agenda.

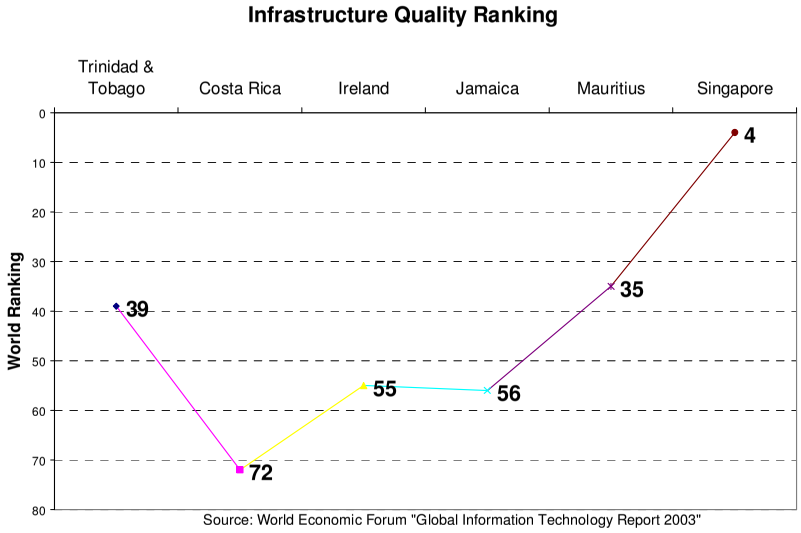


Figure 8. Infrastructure Quality

"Infrastructure Quality" is a broad term encompassing telephone, Internet, wireless and computing technologies.

Broadband Availability

If overall infrastructure quality as a generic whole is quite high, broadband availability as a specific measure shows Trinidad and Tobago lagging behind not only the other comparator countries, but the rest of the world. Only Mauritius, with the lowest broadband availability of all countries surveyed by the World Economic Forum, ranks lower. While broadband is not a prerequisite for delivering simple Web access, more advanced Internet services involving video or other complex data will require the greater through-put of broadband. Simply put, the timing of broadband availability will determine the implementation approach of Trinidad and Tobago's National ICT Vision.

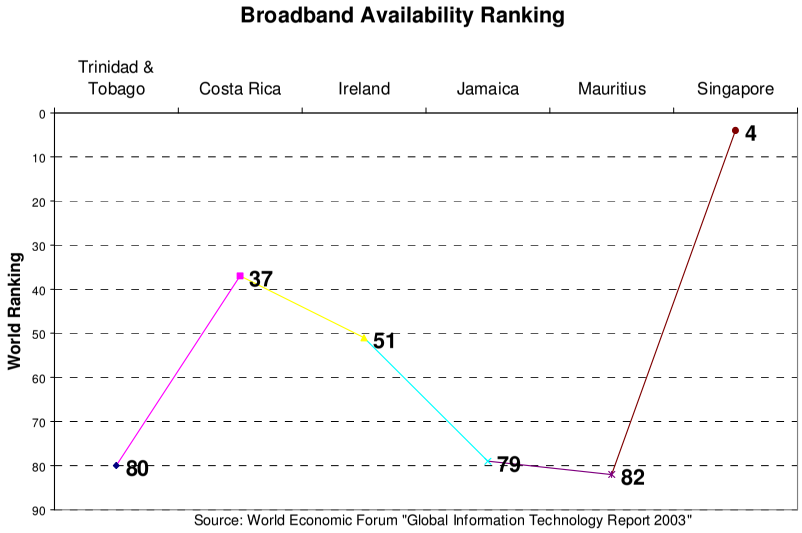


Figure 9. Broadband Availability

Broadband Internet access is required in order to promptly deliver all but the simplest of Internet services.

Infrastructure Comparison

Telecommunications Sector Competition

Based on the survey data, there is a notable correlation between broadband availability and telecommunications sector competition.

	Broadband Ranking	Telcom Comp'n Ranking
Trinidad & Tobago	80	78
Costa Rica	37	73
Ireland	51	41
Jamaica	79	52
Mauritius	82	82
Singapore	4	12

While Costa Rica and Jamaica seem to defy the trend (interestingly, in opposite directions) in other countries the rankings appear very similar. This does not imply direct causation, i.e. that greater competition necessarily leads to increased broadband access, but it is reasonable to consider it as a contributing factor.

Telecommunications Competition and Price

If this ranking were based on empirical data its findings would be more revealing. As it is, this survey question probes the *perception* of telecommunications sector competition on price and quality. The rankings closely mirror those of the previous question, suggesting that respondents believe that competition, or the lack thereof, is directly related to price.

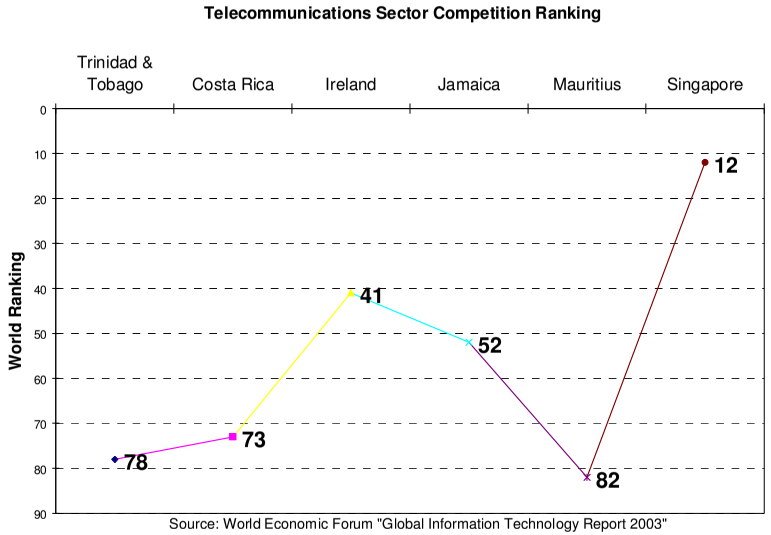


Figure 10. Telecommunications Sector Competition

The trend line for telecommunications sector competition and the perception of competition on price appear similar.

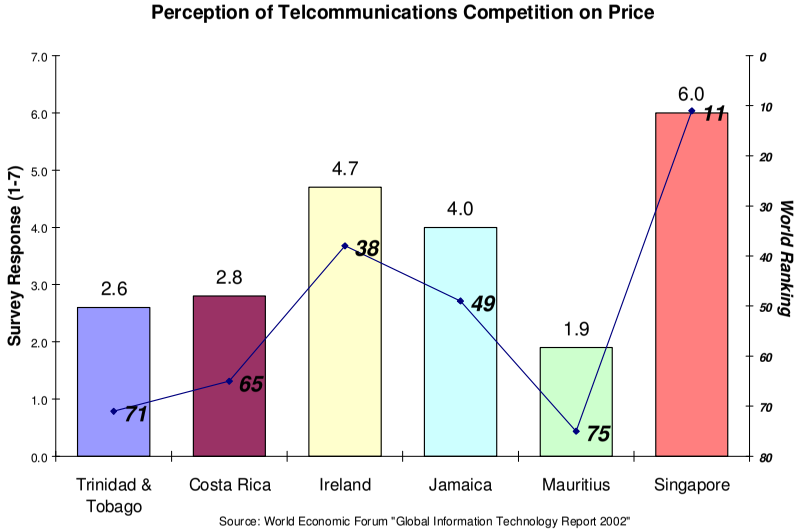


Figure 11. Perception of Telecommunications Competition on Price

Infrastructure Comparison

Summary

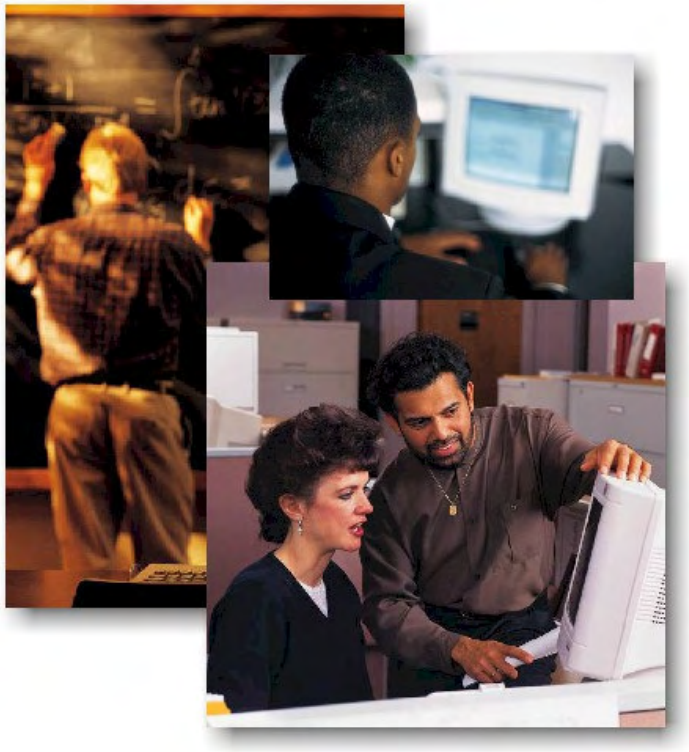
- Trinidad and Tobago's telephone usage is comparatively high for both business and residential customers. Relatively affordable connection and service fees are a contributing factor. Despite connection charges for residential and business customers that are five times those in Trinidad and Tobago, Malta has telephone density and usage rates comparable to Singapore, which are among the highest in the world.
- In sharp contrast, Internet access and usage statistics for Trinidad and Tobago are near the bottom of countries surveyed, and among the lower tier of countries worldwide. Poor affordability of Internet service is one reason for this, although several factors are at play (e.g. lack of familiarity with technology in general, lack of Internet education and awareness, lack of compelling reasons to get online, and frustration at slow speed). Per capita Internet usage in Malta is roughly two-and-a-half times that of Trinidad and Tobago.
- National ICT expenditure is fairly consistent among surveyed countries, averaging approximately 6.5% of GDP. This figure is around the 50th percentile worldwide. Only Singapore, which spends nearly 10% of GDP on ICT, stands out in this category.
- Similarly, in terms of overall infrastructure Trinidad and Tobago compares fairly well among the sample countries, but is average in the global context (39th out of 82).
- Trinidad and Tobago's telecommunication sector competitiveness and broadband availability rankings rate very poorly (78th and 80th worldwide, respectively), although Jamaica and Mauritius face similar struggles. Survey respondents strongly believe that the lack of competition has a strong impact on price and availability.

Human Resources Comparison

About Human Resources

Without an educated, ICT-savvy populace, no community can fully participate in the Networked World. To foster this resource, information and communication technologies must be incorporated into the learning system. Lamentably, although the use of ICTs in education is one of the most powerful catalysts to Networked Readiness, it is an opportunity that is often squandered, misunderstood or underestimated.

Connectivity depends upon the community's incorporation of information and communication technologies into the fabric of its activities in order to maximise the gains of joining in the Networked World. In society-at-large, ICTs can have a profound effect upon people's professional and personal lives by providing easier access to information, more efficient ways to communicate and powerful organisational tools. To understand how a community is using ICTs, it is important to assess not only how many members of the community have access to the technologies, but also how they are using them.



Key Measures:

- Public Schools Quality
- Public Spending on Education
- School Internet Access
- Quality of Math and Science Education
- IT Training Quality
- IT "Brain Drain"

Human Resources Comparison

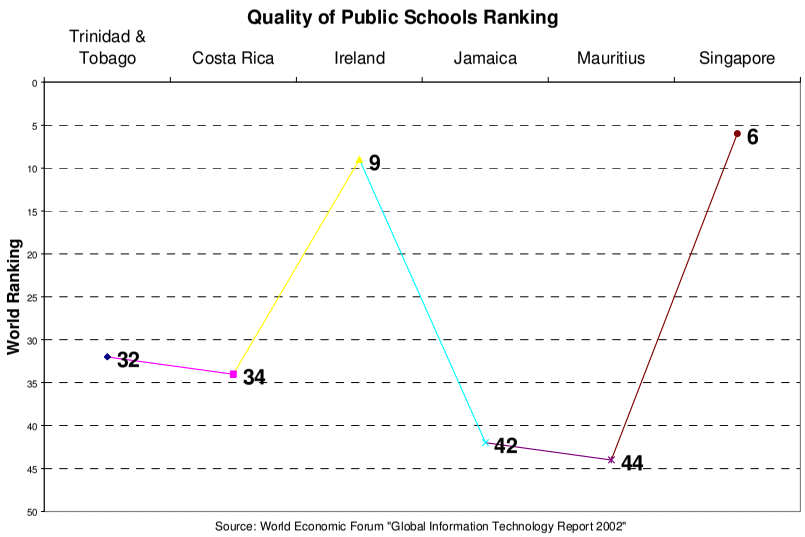


Figure 12. Quality of Public Schools

Public Schools Quality

The education of its people should be one of the highest priorities for all countries, but especially so for countries seeking to improve their level of development. This statistic indicates that Trinidad and Tobago's education system is fairly well regarded. It is somewhat behind more developed countries, but superior to local countries.

Public Spending on Education

If increased spending can lead to increased quality, it would appear that Costa Rica and Jamaica are making efforts to improve their educational systems. Based on these 2003 results, both countries appear to have made educational spending a priority, outspending by far (as a percentage of GNI) the other countries presented here. In comparison, Trinidad and Tobago is seeming to lag. However, this statistic presents an incomplete picture of the state of investment in education. Until more revealing statistics become available, such as "education spending per student", firm conclusions in this area cannot be reached.

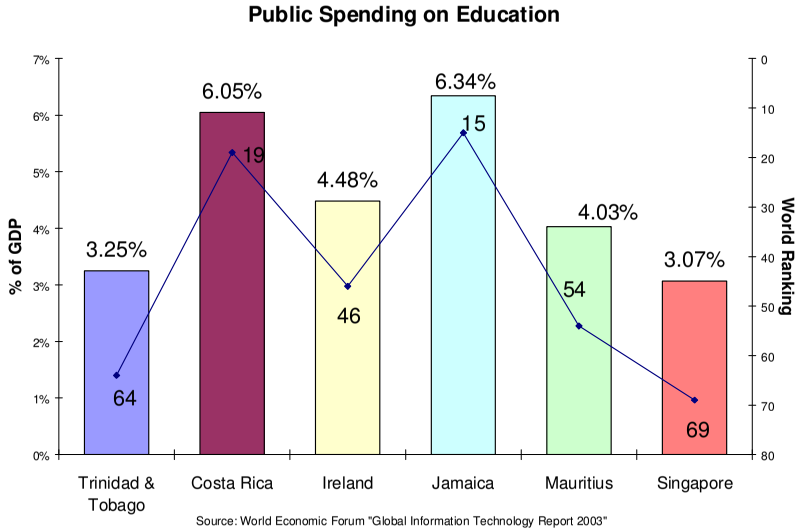


Figure 13. Public Spending on Education

Human Resources Comparison

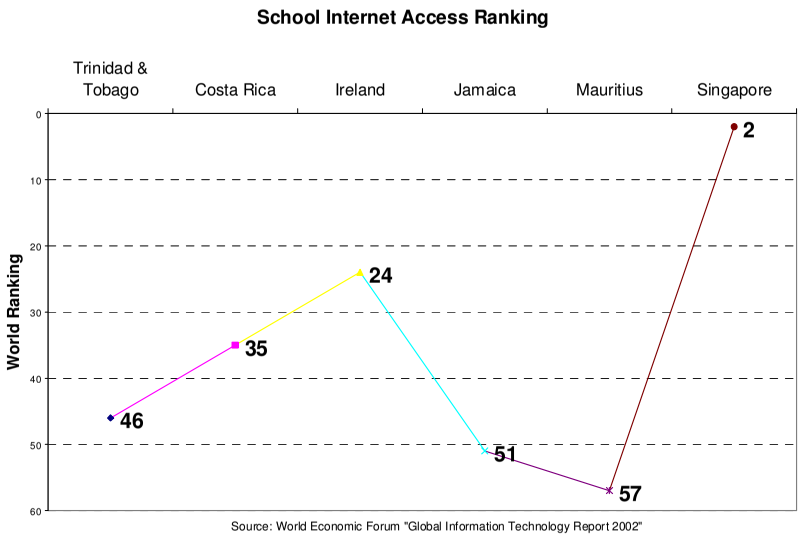


Figure 14. School Internet Access

School Internet Access

In recent years the Internet has proven to be an invaluable education tool, allowing teachers and students to access an entire world of learning materials. Countries that lead in ICT development have made Web-based learning a core component of their educational curricula. After several years of development, considerable educational content is readily available, while countries continue to develop content specifically relevant to their needs. However, without pervasive school-based access, the benefits of this revolution cannot be realised.

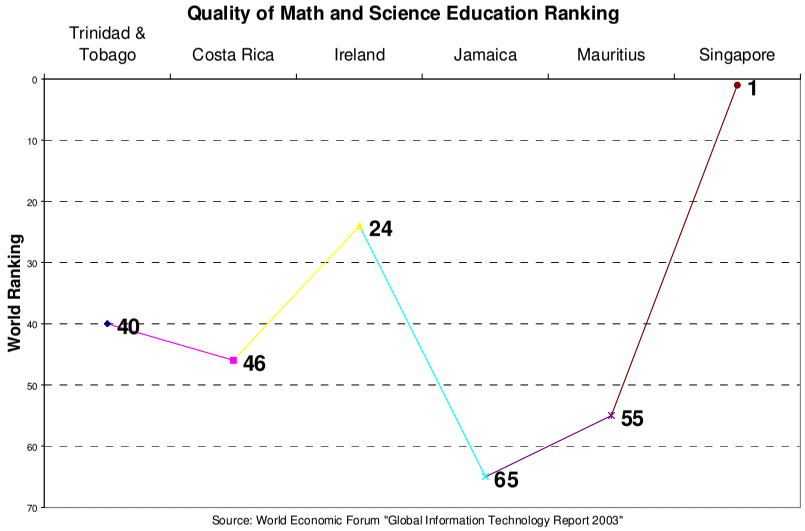


Figure 15. Quality of Math and Science Education

Math and Science Education Quality

Education in math and the sciences can help give students a foundation in the usage and development of information and communication technology. From these disciplines come the skills required for more advanced ICT training. Singapore leads the world in this type of education – just one of the many factors that have led to its place at the top of the ICT hierarchy. At number forty, Trinidad and Tobago is essentially on the median of countries surveyed. The future will tell if it climbs into the ranks of the upper tier, or falls to the lower tier.

Human Resources Comparison

IT Training Quality

If the quality of math and science education helps contribute to the population's readiness for the electronic world, then specialised IT training helps it develop and utilise ICT in more advanced ways. Quality IT training is a pre-requisite for the development of a thriving ICT sector. Again, Trinidad and Tobago finds itself in the middle tier worldwide, and inferior to all but one of the comparator countries. If Trinidad and Tobago cannot develop a sufficiency of ICT talent, it will have to meet its resource needs abroad.

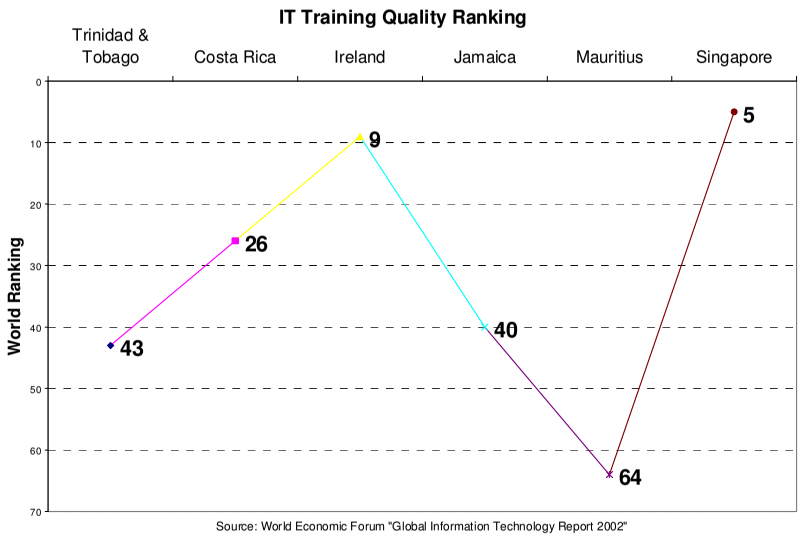


Figure 16. IT Training Quality Ranking

IT "Brain Drain"

Of course, a country must do more than provide its people with quality education. It must provide them with incentives and conditions to remain in the country, so that their skills can help benefit the rest of the population. This statistic is no more reassuring than the quality of IT training. As the lowest ranked country shown, 50th in the world, Trinidad and Tobago must do more to create a climate where IT professionals are welcomed, challenged and rewarded.

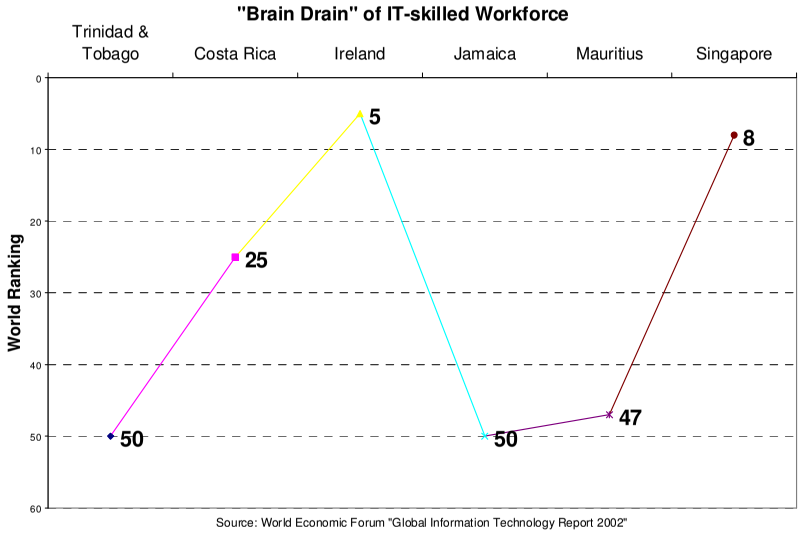


Figure 17. "Brain Drain" of IT-skilled Workforce

Human Resources Comparison

Human Resources: Malta*

The Education Division has been advancing the use of information and communication technology at the primary and secondary school levels. Through a partnership with Malta Information Technology and Training Services Ltd. (MITTS), it is planned that all secondary schools, and a large part of the primary schools, will be connected to the Internet this year. The schools will make up a network of over 5,000 computers – 845 in secondary school labs, and over 4,000 in primary school classrooms – connected via ADSL and cable technologies. Each school will be allotted 25Mb of data to be used for creating a school Website, while individual students will have 5Mb for their own personal Web pages. 150,000 student e-mail accounts will be provided.

Providing child-safe Internet access was a concern in Malta. After considering various options, a "walled garden" approach to safe browsing was selected, whereby students can access over 60,000 pre-defined sites. Users may request the addition of sites to the access list at any time.

A schools portal designed to help inexperienced users quickly access a number of sites has been set up (http://schoolnet.magnet.mt/).

Teachers are receiving training in the use of ICT in the classroom, including learning how to create content for the Internet. Courses available include:

- *Basic computer and Internet awareness*
- *Common business applications (Word, Excel, etc.)*
- *Website creation and graphics*
- *European Computer Driving License (7 modules, encompassing 75 hours of instruction)*

For more information on the training resources available to teachers, please see http://curric.magnet.mt/courses/.

According to a 2002 survey on national ICT usage, 30.5% of the general population has undergone basic computer training. Among this group are 82.8% of students age 15 and above. Only 10% of those 55 years of age and over have received instruction in computer usage.

** Source: "ComputerWise – Official Newsletter of the Information and Communications Technology Learning Centre", Department of Curriculum, Implementation and Review – Education Division, Malta, Issue 6 – November 2001*

Human Resources Comparison

Summary

Based on the benchmarking data collected, it appears Trinidad and Tobago is not adequately preparing its people for ICT development. While other countries are investing in education and training required to enable people to take advantage of ICT for social and economic development, Trinidad and Tobago is slipping behind.

Trinidad and Tobago's educational system is fairly well developed, ranking 32nd in the world in terms of public school quality. Among countries studied, this trails only the more developed Singapore (6th) and Ireland (9th). However, there are indications that this level of performance may be deteriorating. In 2002, Trinidad and Tobago spent only 3.25% of GDP on public education, compared with 6.05% for Costa Rica and 6.34% for Jamaica. Only Singapore spent proportionally less, but it can be reasoned that, with its much higher GDP per capita, spending on education is not inadequate. A more revealing statistic might be "spending on education per student", but this information was not available.

Malta has embarked on an ambitious "ICT in education" program that will eventually connect each school in the country, and incorporate ICT training into the core educational curriculum.

From the information collected, it is difficult to ascertain the effect of lesser spending. What is clear is that in two areas of ICT education, "school Internet access" and "quality of math and science education", Trinidad and Tobago is firmly in the middle of the pack, both within this study and globally (46th and 40th, respectively). Singapore, a country known for ICT innovation, ranks 2nd and 1st in the world in these categories. In order to advance in the global rankings, Trinidad and Tobago must focus additional attention on these key indicators of ICT development.

A similar story is repeated in the area of IT training quality, where Trinidad and Tobago ranks 43rd – not exemplary by any means. Of perhaps greater concern is the country's inability to retain IT talent. In terms of the "IT Brain Drain", Trinidad and Tobago ranks last in this study, and 50th overall – a source of concern for a country embarking on a path of ICT development.

The objectives of the National ICT Plan include "focusing on the development of our children, and adult skills to ensure a sustainable solution and a vibrant future" and developing a knowledge-based society. Clearly, much work needs to be done in the area of human resource development in order to achieve these objectives.

Economy and Finance Comparison

About Economy and Finance

Businesses and governments that are able to effectively employ important information and communication technologies find more sophisticated and efficient ways of managing their external relationships and communications. This growing ICT usage helps form the critical mass of electronic transactions which supports a networked economy, both in terms of the network size and the demand for associated goods, services, labour and policy reform.

Key Measures:

- Company Web Page Pervasiveness
- Internet-based Payment System Usage
- "B2C" e-Commerce
- "B2B" e-Commerce
- Buyer-Supplier Internet Coordination
- Venture Capital Availability
- Cluster Development
- Capacity for Innovation.

Economy and Finance Comparison

Company Web Page Pervasiveness

One of the most straightforward measures of an economy's acceptance of ICT tools and systems is the pervasiveness of corporate Web sites. Not having a Web presence signals to customers, suppliers, investors and competitors that advanced communication techniques are not on the corporate agenda. Trinidad and Tobago ranks near the bottom in terms of company Web page pervasiveness. This could be attributed, in part, to the nature of the country's traditional industries, i.e. the energy sector, where the usefulness of Internet technologies may not have been as apparent. However, considering the severity of the rating (60th worldwide), it would seem that there is considerable room for improvement.

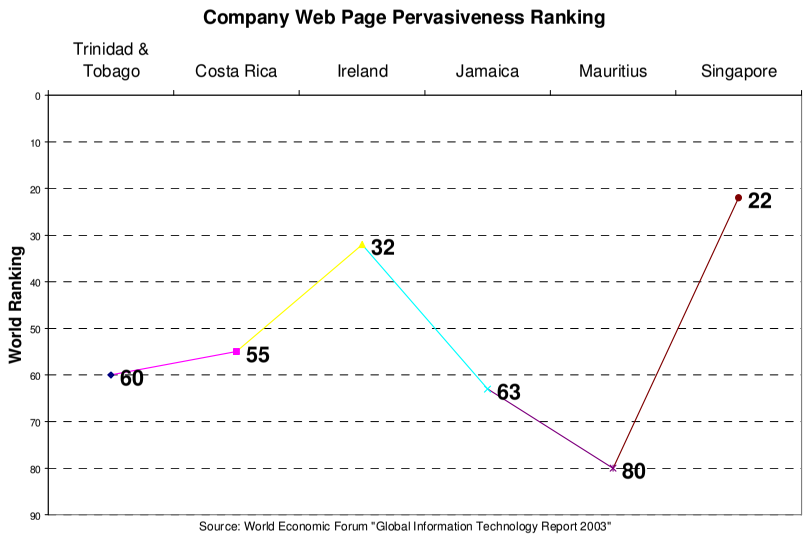


Figure 18. Company Web Page Pervasiveness

Internet-based Payment System Usage

Internet-based payment systems are at the heart of e-commerce. Without electronic payments of some sort, business transactions cannot take place. Thus, a country's usage of these systems essentially determines its e-commerce capabilities. According to these statistics, Trinidad and Tobago has made respectable efforts to promote the acceptance and usage of electronic payment systems. However, these findings are inconsistent with information on the state of electronic payments recently collected in-country. Nonetheless, if the World Economic Forum information is accurate, it should have a positive effect on the development of consumer- and business-oriented e-business.

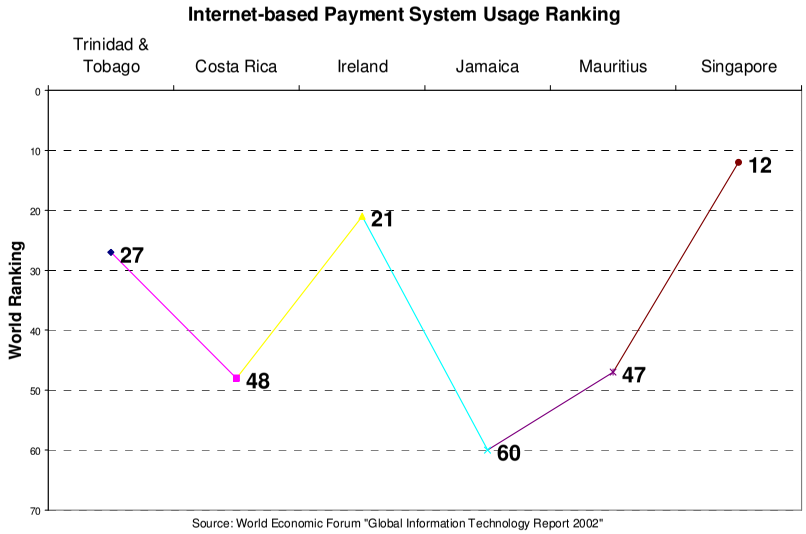


Figure 19. Internet-based Payment System Usage

Economy and Finance Comparison

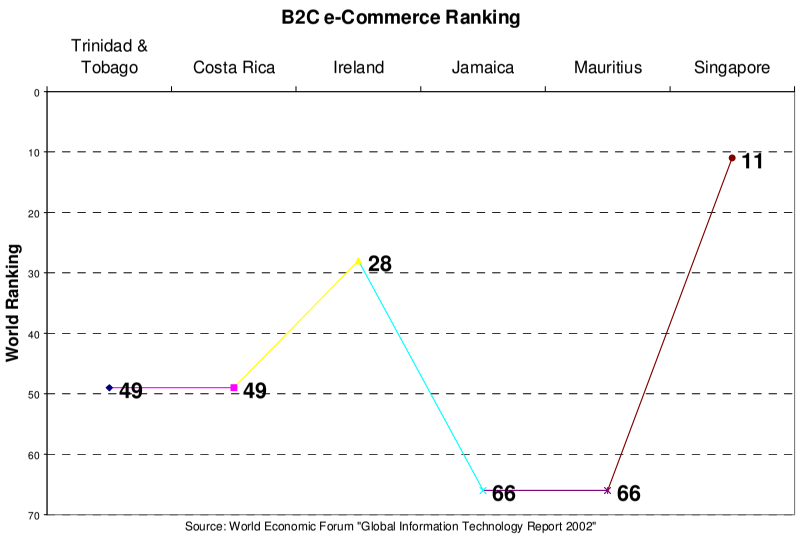


Figure 20. "B2C" e-Commerce

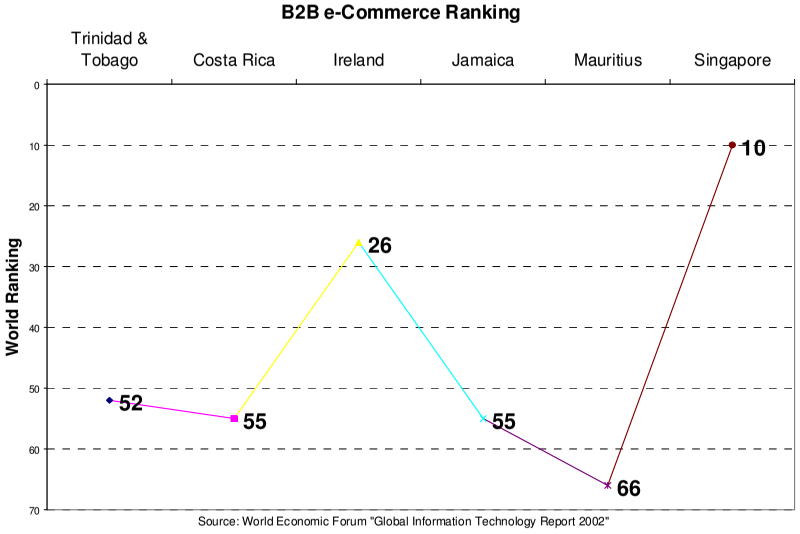


Figure 21. "B2B" e-Commerce

Business-to-Consumer (B2C) and Business-to-Business (B2B) e-Commerce

It is quite surprising then that in Trinidad and Tobago, B2C and B2B e-commerce has been slow to gain acceptance. Clearly, the prevalence of e-payment systems has not jumpstarted these segments of the economy. Is "e-payment" an overrated predictor of e-commerce development?

	e-Payment	B2C	B2B
Trinidad and Tobago	27	49	52
Costa Rica	48	49	55
Ireland	21	28	26
Jamaica	60	66	55
Mauritius	47	66	66
Singapore	12	11	10

Not really. For most countries, there is a direct relationship between e-payment usage and e-commerce development. Not so in Trinidad and Tobago and Mauritius where, despite relatively pervasive e-payment availability, e-commerce has not taken hold with businesses or consumers. It is imperative that these economies identify the other factors that contribute to the lack of e-commerce usage, so that planning efforts can address the shortfall.

Economy and Finance Comparison

Buyer-Supplier Internet Coordination

In many countries where e-commerce has taken off, the first priority was to ensure the ease of use and "seamlessness" of the customer experience. Less attention was paid to the streamlining of the back-office processes and systems that supported the customer transactions. For organisations that had to support electronic and traditional service delivery channels, e-commerce was a tremendous burden.

However, firms soon learned to leverage the capabilities of Web-based communications. Process automation, buyer-supplier coordination, and customer relationship management techniques ushered in a new era of efficient e-commerce.

Buyer-supplier Internet coordination is often seen as a more advanced form of e-commerce (not that this needs to be true, but the perception remains). Therefore, those countries that scored poorly in B2C and B2B e-commerce rankings, including Trinidad and Tobago, are even further behind in terms of buyer-supplier coordination. There are significant benefits to be realised from innovation in this area – firms should be encouraged to increase their adoption of the principles and technologies of buyer-supplier coordination.

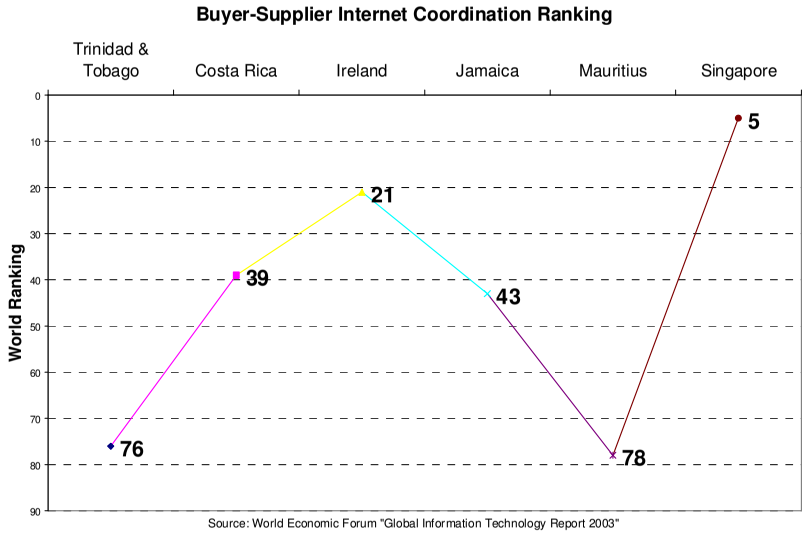


Figure 22. Buyer-Supplier Internet Coordination

Venture Capital Availability

The availability of capital helps foster economic development, irrespective of the presence of ICT. For a smaller economy, Trinidad and Tobago seems to have considerable access to venture capital, ranking ahead of local competitors Costa Rica and Jamaica. This could be considered an asset when planning National ICT development efforts.

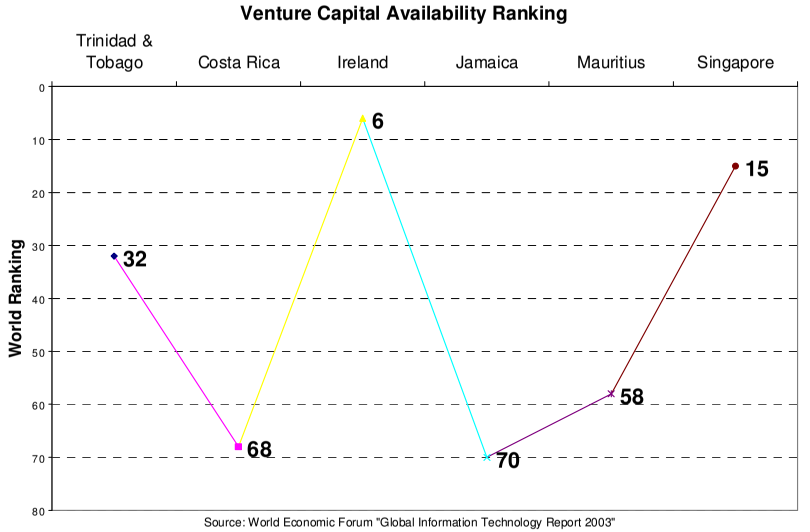


Figure 23. Venture Capital Availability

Economy and Finance Comparison

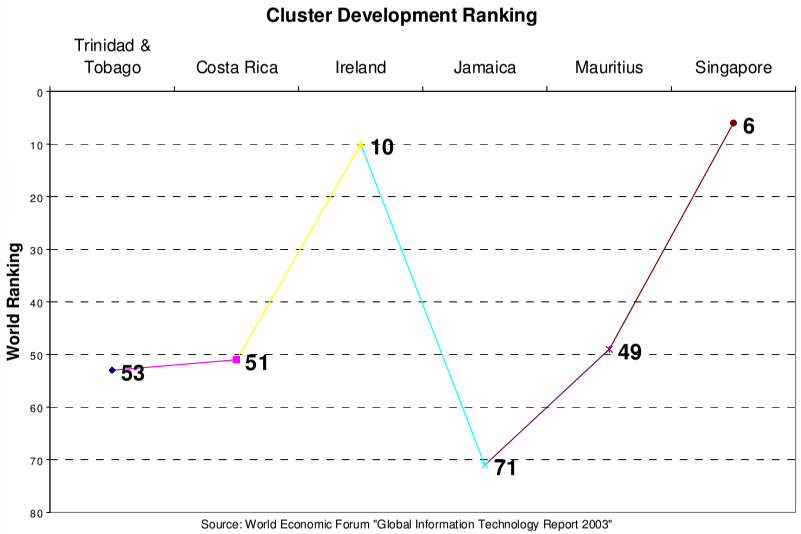


Figure 24. Cluster Development Ranking

Cluster Development

In recent years the nurturing of industry "clusters" –geographic concentrations of interdependent firms in related industries – has been touted as a recommended path to economic development. Silicon Valley in California, U.S.A. is one such example, where world-class clusters have sprung up around the computer, semiconductor, and software industries. Even less-developed countries such as India (software) have fostered successful ICT industry clusters. Whether the cluster-development route is one that Trinidad and Tobago wishes to take remains to be seen. At this point however, Trinidad and Tobago has very little experience with clusters, not unlike its local competitors.

Capacity for Innovation

This measure examines countries' propensity to obtain technologies by conducting formal research and pioneering their own new products and processes. Countries like Trinidad and Tobago, Jamaica, and Mauritius tend to obtain technologies exclusively through licensing or imitating foreign companies.

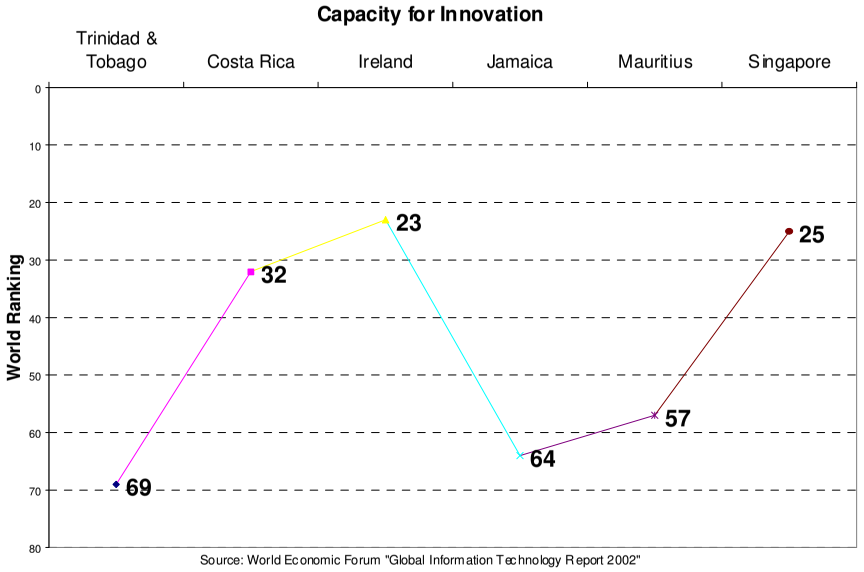


Figure 25. Capacity for Innovation

Economy and Finance Comparison

Summary

- Trinidadian and Tobagonian companies have been slow to adopt corporate web page usage, ranking 60th in the world. However, this seems to be the norm among the less developed countries in the survey, as Costa Rica (55), Jamaica (63) and Mauritius (80) all rank poorly in corporate web page pervasiveness. Similarly, neither "B2B" (52) nor "B2C" (49) e-commerce applications have been widely implemented in Trinidad and Tobago. Based on this information, it is hardly surprising that in terms of buyer-supplier Internet coordination – a more sophisticated application of ICT to business – Trinidad and Tobago has missed the boat. It ranks in a virtual tie with Mauritius, among the worst of 82 countries surveyed.
- There is little in the way of ICT cluster development within any of the less developed countries. Trinidad and Tobago (53) is essentially on par with Costa Rica (51) and Mauritius (49). Only Jamaica is left behind at 71st in the world.
- It does not seem intuitive then that, according to the survey data, Internet-based payment systems are fairly commonly used. Trinidad and Tobago's global ranking of 27 is well ahead of the less-developed economies, and only slightly behind Ireland (21).
- The prospects for ICT development in the economy and finance area are bolstered by Trinidad and Tobago's ability to attract venture capital (32), which exceeds by a large margin its closest rivals Costa Rica (68) and Jamaica (70).

Economy and Finance: Malta*

Primary drivers of the Maltese economy include manufacturing (e.g. electronics and textiles) as well as tourism. Direct production contributed to approximately 34 per cent of GDP, while market services accounted for just above 49 per cent.

Malta's manufacturing sector is faced with a number of challenges including:

- *Need to penetrate foreign markets (i.e. EU) in order to achieve economies of scale;*
- *Need to develop technological centres of excellence in technologies which are vital to their region;*
- *The "two economies" effect – the almost total absence of linkages between the low technology, small scale local Maltese companies and the high technology, large scale foreign enterprises.*

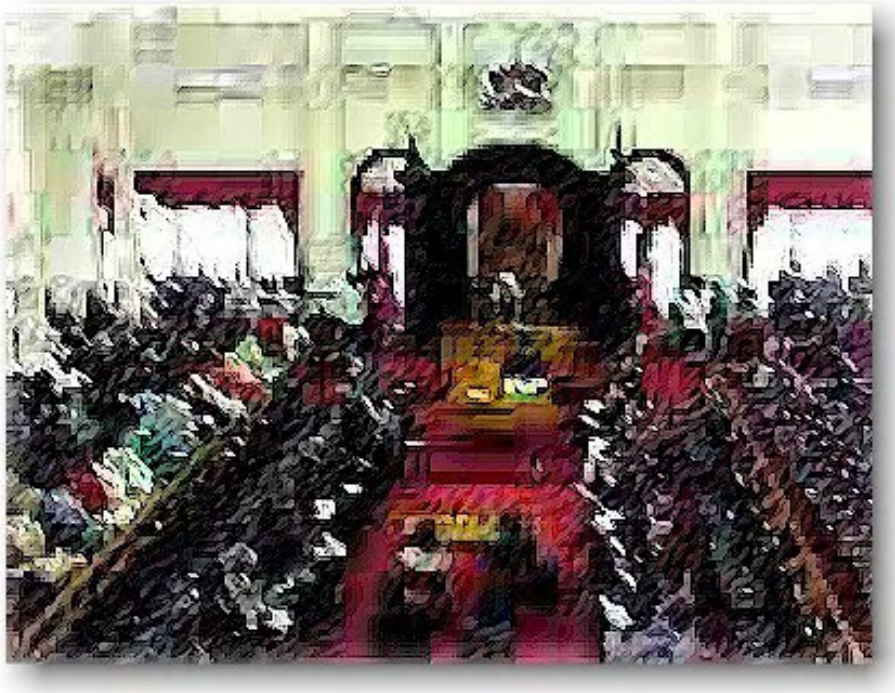
The Malta Tourism Authority helps promote tourism through its tourism portal (www.visitmalta.com). In addition to basic tour information and photos, e-brochures are available for many tourist destinations. An interactive map allows visitors to find information on all attractions and destinations. Certain tour operators offer online travel booking (www.maltadirect.com).

** Source: Malta's National Development Plan for Economic and Social Cohesion 2003 - 2006*

e-Government Comparison

About e-Government

Governments can take advantage of information and communication technologies to improve connections with their constituents, including using the Internet to post information online and to offer interactive services for the public. Governments can also lead by example and become a catalyst for the networked economy by investing in information and communication technologies for their internal use, leading to more efficient operations and the creation of a local market for ICT equipment and services. Relationships with government contractors and procurement mechanisms can be streamlined by putting them online. ICTs can make government activities more transparent to citizens and other observers. They can also enable the government to signal to foreign investors that the country is modern, efficient, and worthy of investment.

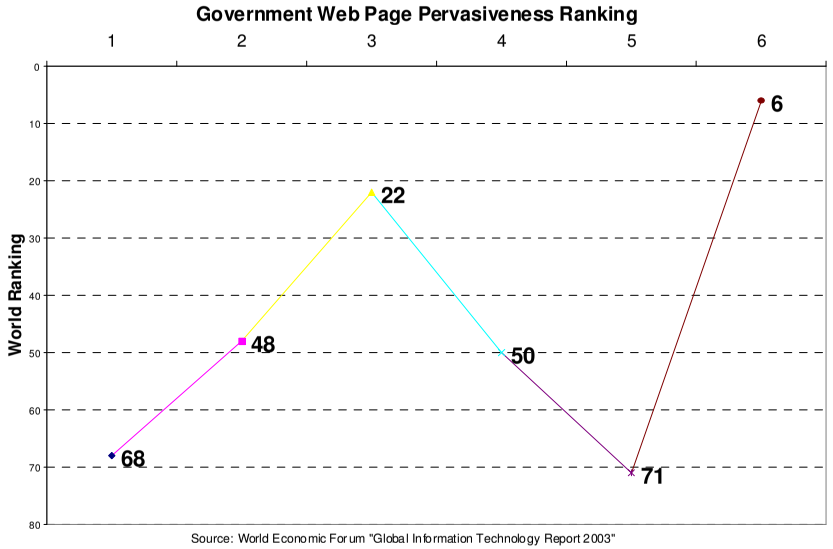


Key Measures:

- Government Web Page Pervasiveness
- Government ICT Prioritisation
- Government Success in ICT Promotion
- Internet-based Transactions
- Online Government Service Availability.

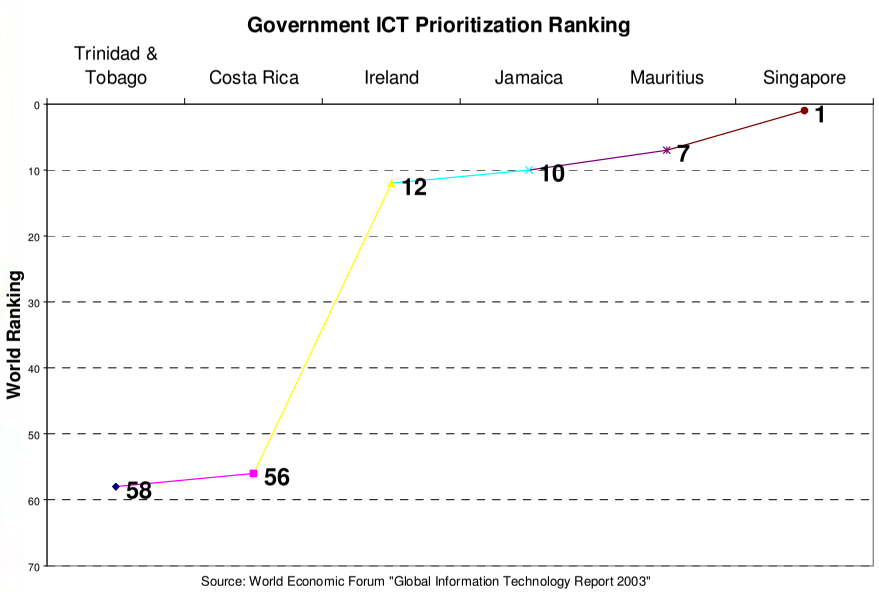
e-Government Comparison

Figure 26.
Government Web Page Pervasiveness



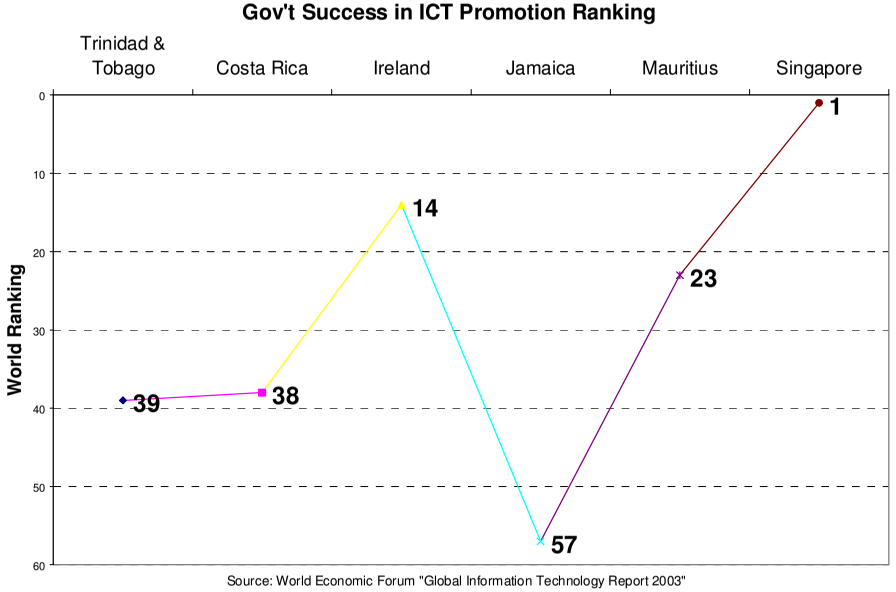
In Trinidad and Tobago only about half of government ministries feature Web sites. These tend to feature basic, static information that is not updated frequently. Trinidad and Tobago's rank of 68 is among the lowest of countries surveyed.

Figure 27.
Government ICT Prioritisation



According to survey data collected in 2002, Trinidad and Tobago's government prioritisation of ICT is very low. Recent initiatives, such as the National ICT Plan, are a big step forward in correcting this situation.

Figure 28.
Government Success in ICT Promotion



A huge gap exists between the Jamaican government's prioritisation of ICT and its promotion. However Trinidad and Tobago, like Costa Rica, has been an effective promoter of ICT even when it has not been the top priority of government.

e-Government Comparison

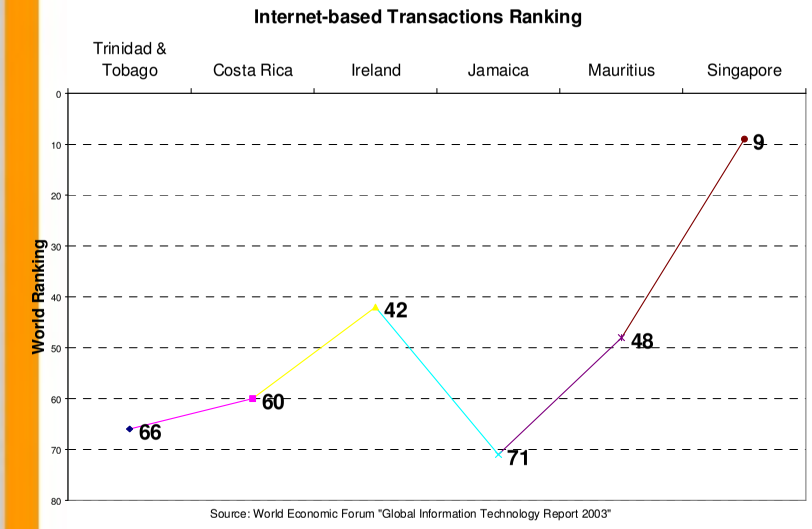


Figure 29. Internet-based Transactions Ranking

A familiar pattern is emerging. Trinidad and Tobago's National ICT Plan and Public Sector Reform must address shortcomings in the delivery of government services. Additionally, Trinidad and Tobago's rating of 66th in the 2003 study is a decline from its 2002 ranking of 58th.

In the 2002 study, Trinidad and Tobago's ranking of 72 was third-lowest in the world after Zimbabwe and Romania. In the 2003 study most countries, including Trinidad and Tobago, declined in the rankings, although the larger survey size (74 countries to 82) generally accounts for this.

Singapore remained constant at number one.

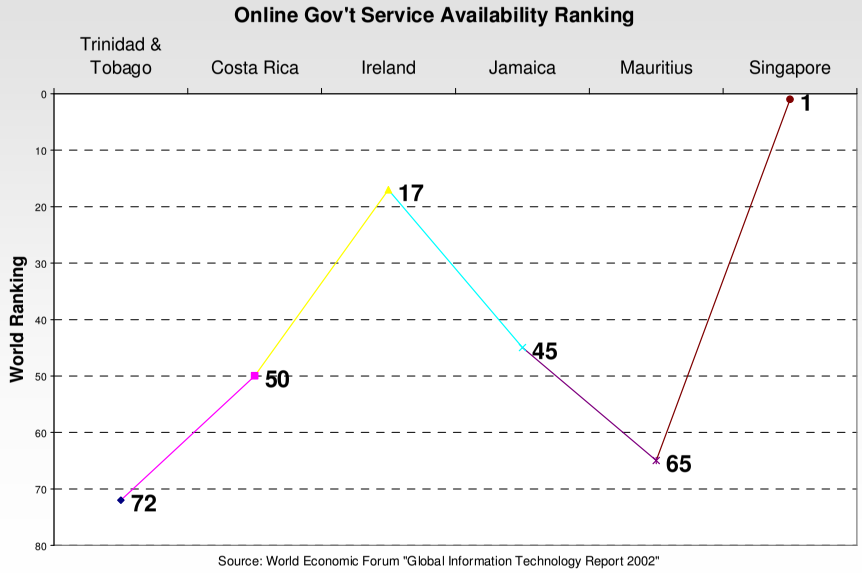


Figure 30. Online Government Service Availability (2002)

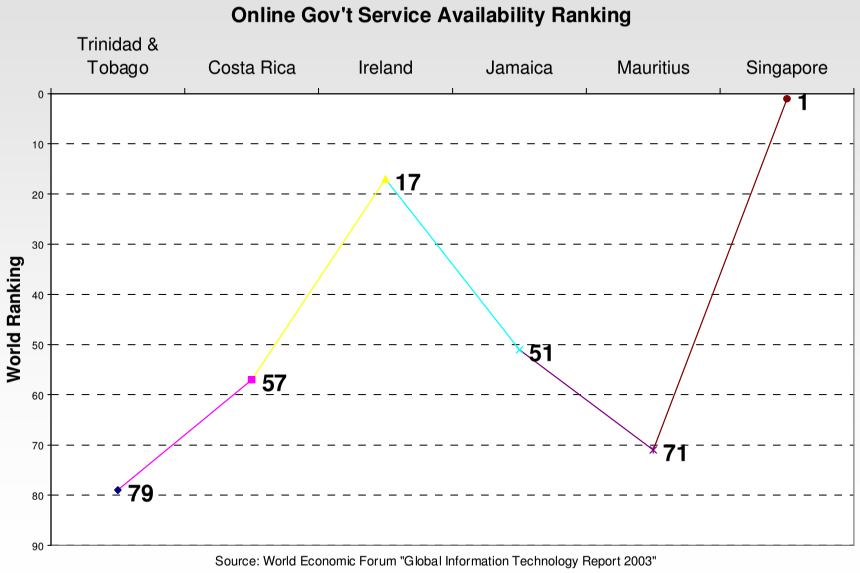


Figure 31. Online Government Service Availability (2003)

e-Government Comparison

e-Government: Malta*

In striving for its goal of raising the quality of life of the Maltese, the Government will actively promote and utilise Information and Communication Technology to the widest possible extent. The strategy to attain this mission, as expressed in the White Paper on the Vision and Strategy for the Attainment of eGovernment (October 2000), is based on the following principles:

> *"All Maltese will have the opportunity and the means to participate in the Information Society and the Information Economy irrespective of their financial, social or educational circumstances.*
>
> *The Government will actively promote the creation of the Information Society and the Information Economy via the provision for transactional on-line eGovernment Services.*
>
> *The Government will provide the necessary policy, institutional and regulatory framework that is required for the successful proliferation of electronic commerce.*
>
> *Businesses will be encouraged to adopt electronic commerce.*
>
> *The achievement of computer literacy by all sectors of the population will be actively pursued.*
>
> *The necessary measures will be taken to build up a critical mass of Information Technology specialists that will be required to sustain the growth of the Information Society and the Information Economy.“*

Other objectives of the e-Government Strategy are outlined as follows:

“Through these measures, citizens will benefit from convenient electronic services provided by both the public and private sector. The communications infrastructure will be of the highest standards, giving users high-bandwidth, low cost, reliable and secure access to the Internet, via a host of access channels. The liberalisation process relative to the telecommunications sector will bring about a more competitive service, lowering prices and increasing quality to the benefit of consumers. The benefits of increased competition are already very visible in the mobile telephony sector.

It is expected that setting up and running of eGovernment will require the acquisition of substantial services from the private sector and will therefore provide the significant impetus to the development of the local IT community. In addition, the adoption of eCommerce solutions in such activities as public procurement is widely recognised as being a trigger for the widespread adoption of eCommerce in the business community. Also, on-line Government services will fuel consumer demand for Internet usage. It is also believed that having the security infrastructure handled by Government will increase consumer confidence in the safety of electronic transactions.”

** Source: “Prosperity in Change – The Way Forward”, National Industrial Policy, Ministry for Economic Services (2003)*

e-Government Comparison

e-Government: Malta *(continued)*

On May 17, 2002 Malta launched its Internet portal (www.gov.mt). Services for various constituent groups are available, including businesses, families, the elderly, and visitors, and are organised into 15 "clusters". The site, which is managed by the Central Information Management Unit (CIMU), also features an "A-to-Z" Directory that includes links to Ministries, departments, and other organisations.

Each government Ministry has established an online presence consistent with the government's Web standards and guidelines. As of today, a number of Government services are available, including transactional services such as the application for a birth/marriage and death certificate, the submission and payment of an income tax return and the application for an examination.

Other e-Government initiatives include:

- *An electronic payment gateway that enables Government to receive payments in a secure electronic form, which will enable the implementation of services that require secure on-line payment;*
- *A registration and authentication service that will provide an accessible and secure digital signature mechanism, enabling citizens to uniquely identify themselves when dealing with government online;*
- *A Central Data Repository, which by providing a single location for information, will act as a central reference point for e-Government services*

The Maltese e-Government Portal

e-Government Comparison

Summary

Even the latest survey results are one or two years out of date, which may be a caveat in considering the Government benchmarking results. However, as recently as 2001, the Trinidad and Tobago government's prioritisation of ICT ranked 58th in the world – far behind peer countries such as Jamaica (10th) and Mauritius (7th). This is perhaps why the prevalence of online government services in this country was rated 72nd for the same period – last among the benchmarking study countries, and near the lowest in the world. The government's National ICT Plan must address significant shortcomings in the area of e-Government service delivery.

It is worth mentioning that in Trinidad and Tobago, the government is seen as an effective promoter of ICT (39th), which could help ICT planning efforts to quickly gain widespread acceptance.

Legal and Policy Comparison

About Legal and Policy

Public policy can be a help or a hindrance to the networked economy. The favourable climate that public policy can create for Internet use and e-commerce encourages communities, organisations and individuals to invest and use information and communication technologies. Important aspects of networked readiness such as Internet availability, and ICTs in schools, are all influenced by public policy. For a community to become ready for the networked world, the appropriate policy-makers must realise the implications of their decisions upon ICT adoption and use.

Key Measures:

- Legal Framework for ICT Development
- Law-making Bodies Effectiveness.

Legal and Policy Comparison

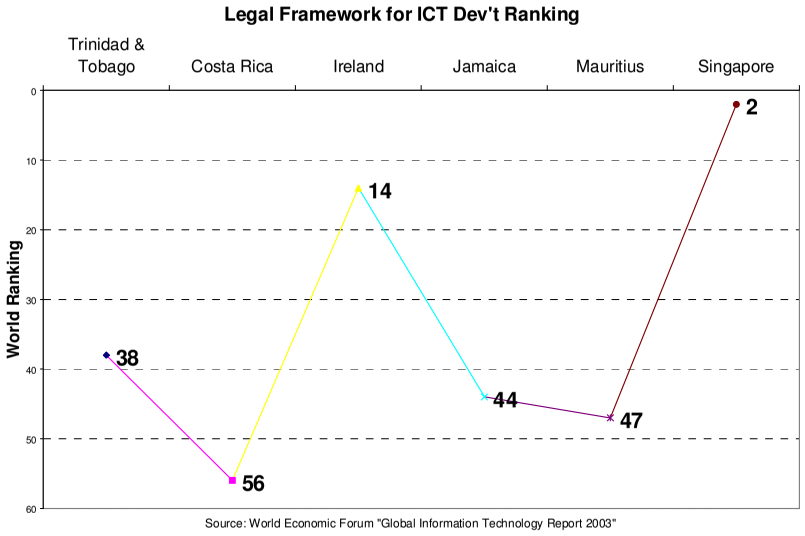


Figure 32. Legal Framework for ICT Development

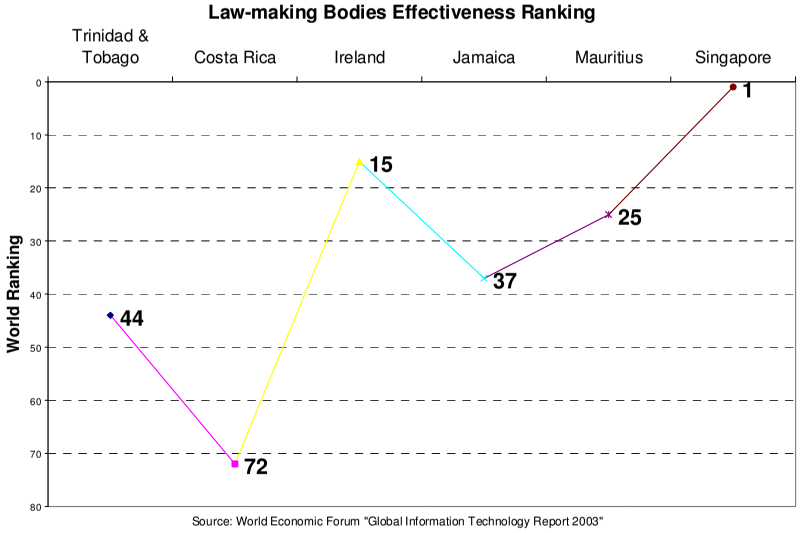


Figure 33. Law-making Bodies Effectiveness

Legal Framework for ICT Development

Law-making Bodies Effectiveness

The data for these two charts is based on survey responses. That is, they reflect the *perception* of the effectiveness of the legal framework for ICT specifically, and the effectiveness of law-making bodies in general. It would be difficult to identify a wholly objective measure of the ability of a nation's legal mechanisms to support ICT transformation. Clearly, respondents are confident in Singapore's ability to address emerging ICT legal issues, while that confidence is lacking elsewhere. Are these conclusions justified?

It is impossible to answer this question fully with survey responses. An in-depth investigation of Trinidad and Tobago's current legal framework must be undertaken. At issue is the ability of the law to support a number of ICT initiatives*. While these initiatives are still being formulated, it is recommended that policy and law-makers consult with ICT planners to better understand the legal implications, and to determine the challenges posed by Trinidad and Tobago's current legal framework. Only this will produce an understanding of Trinidad and Tobago's legal e-readiness, and if the comparisons with other nations are valid.

* See "NICT Legal Working Group Session v2.0, May 2003", for more information on relevant legal issues pertaining to ICT.

Legal and Policy Comparison

Legal and Policy: Malta*

As part of its national ICT planning, Malta has been considering some of the legal and policy challenges related to ICT development:

Intellectual Property and Data Protection

The efficiency of the generation and application of knowledge depends on the degree and reliability of the protection of intellectual property — patents, copyrights, and trademarks. Effective intellectual property protection is an essential cornerstone for creating an attractive investment climate. Firms planning to develop and market innovative products will not invest without assurance that their trademarks are protected. Accordingly, intellectual property rights will be rigidly protected. Local legislation concerning intellectual property rights has been recently updated to reflect current practice within the European Union.

Of similar significance is the need for effective data protection. Worldwide Internet use is growing very fast. Estimates of the value of global Internet commerce range from 1.3% to 3.3% of global gross domestic product in 2001 — equivalent in size to the economies of Australia and the Netherlands combined. This international phenomenon is also affecting trade practice within Malta, where use of the Internet, as well as electronic commerce, is growing too. This creates the need for a regulatory framework that is suited to this technology. For example, any personal information citizens electronically communicate to government is kept within gov.mt itself in accordance with the Data Protection Act 2001. Meanwhile, specific regulations on e-commerce that will protect both suppliers and consumers are still being considered.

** Source: "Prosperity in Change – The Way Forward", National Industrial Policy, (2003)*

Legal and Policy Comparison

Summary

Reliable data on the effectiveness of legal bodies in facilitating ICT development are difficult to acquire. Instead we must rely on survey questions that probe the perception of legal body effectiveness. Perhaps this is why the responses for this section tend to reinforce findings from other sections of the study, namely that more developed countries tend to be more advanced in each aspect of ICT development – law-making and policy reform included. In contrast, Trinidad and Tobago is doing average at best, typically slightly ahead of or slightly behind comparator countries in various respects. The Legal and Policy comparison is no different. In ranking countries' legal frameworks for ICT development, Trinidad and Tobago comes in 38th, its law-making bodies effectiveness 44th. Both rankings are far below those for Singapore and Ireland. In one criterion, Trinidad and Tobago surpasses Jamaica and Mauritius, in the other it trails them. More detailed analysis is required before the true state of legal and policy preparedness for ICT in Trinidad and Tobago is understood.

Benchmarking Study Conclusions

The Benchmarking Study represents a snapshot of how Trinidad and Tobago is currently faring in terms of ICT development. It is not intended to be a detailed investigation. It examines a sampling of key indicators of ICT development, with the goal of providing the reader with a general impression of ICT progress relative to various other countries. It also provides insight into certain areas that should be addressed in the National ICT Plan, either as assets to be leveraged, or as liabilities to be mitigated. Along with the e-Readiness Report, this document is a crucial part of the ICT planning process: knowing where you are today. Overall, the Benchmarking Study findings support and enhance the results of the e-Readiness Assessment. Together they present a clear picture of the current state of ICT development in Trinidad and Tobago.

Trinidad and Tobago has much in common with a number of small-island developing states that have recently embraced the challenge of ICT development. ICT is not as pervasive in these societies as it is in more developed countries. However, certain building blocks are undeniably present. In Trinidad and Tobago these are:

- High GNI per capita for a country in this geographic region
- Strong use of fixed line telephone service
- High quality of public schools
- High availability of venture capital
- Adequate overall infrastructure quality.

Conversely, there are a number of areas which undermine Trinidad and Tobago's ability to successfully create an information society:

- Low general Internet usage, mirrored by low availability of business and government online services
- No definitive bandwidth policy
- Low telecommunications sector competition resulting in poor access, bandwidth and affordability
- High incidence of IT "brain drain".

In future, as ICT plans unfold, ongoing measures of tracking development progress must be implemented, and regularly updated. While referencing the findings of this initial study, these measures will hopefully indicate steady and sustainable advancement toward developed country status for Trinidad and Tobago.

Appendix

– *Data Tables by Topic*

Data Tables by Topic – General

General Benchmarking Statistics

	Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore	Malta
Source: Worldbank.org "Country at a Glance" tables, 2001							
Population in millions	1.3	3.9	3.8	2.7	1.2	4.1	0.395
Adult literacy rate (% ages 15 and over)	94%	96%	N/A	87%	85%	93%	92%
Urban population (% of total population)	75%	60%	59%	57%	42%	100%	91%
GNI per capita - Atlas method (US$)	5960	4060	22850	2800	3830	21500	9210
Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003							
Overall Networked Readiness (2002)	46	45	19	56	51	8	?
Overall Networked Readiness (2003)	58	49	21	60	56	3	?

Data Tables by Topic – Infrastructure

Infrastructure Benchmarking Statistics

Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003

			Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore
2002 Report:								
1.4	Cellular subscribers per 100 inhabitants	Hard data	10.29	5.19	66.75	14.24	15.08	68.38
1.4	Cellular subscribers per 100 inhabitants	Rank	50	60	13	43	42	10
4.1	Internet access cost	Hard data	3.30	5.43	0.91	8.40	5.10	0.84
4.1	Internet access cost	Rank	32	44	17	48	40	14
4.2	Perceived effect of telecommunications competition on quality and price	Survey data	2.6	2.8	4.7	4.0	1.9	6.0
4.2	Perceived effect of telecommunications competition on quality and price	Rank	71	65	38	49	75	11
2003 Report:								
1.3	Competition in the telecommunications sector	Survey data	2.56	2.79	4.65	3.98	1.94	6.00
1.3	Competition in the telecommunications sector	Rank	78	73	41	52	82	12
1.9	ICT expenditure (% of GDP)	Hard data	6.47%	6.22%	6.70%	6.70%	6.56%	9.70%
1.9	ICT expenditure (% of GDP)	Rank	45	47	39	38	42	5
3.1	Overall infrastructure quality	Survey data	4.34	2.56	3.37	3.32	4.41	6.62
3.1	Overall infrastructure quality	Rank	39	72	55	56	35	4
3.2	Local availability of specialized IT services	Survey data						
3.3	Number of telephone mainlines (per 1000 people)	Hard data	231.00	249.40	419.80	198.60	235.30	484.40
3.3	Number of telephone mainlines (per 1000 people)	Rank	43	41	28	49	42	21
3.4	Number of telephone faults (per 100 main lines)	Hard data	75.00	65.10	4.95	48.00	56.42	0.02
3.4	Number of telephone faults (per 100 main lines)	Rank	75	74	16	68	72	1
4.3	Availability of broadband access	Survey data	2.31	4.11	3.88	2.53	2.20	5.83
4.3	Availability of broadband access	Rank	80	37	51	79	82	4
4.4	Public access to the Internet	Survey data	3.30	4.25	3.93	2.69	2.94	5.68
4.4	Public access to the Internet	Rank	55	23	31	74	65	6
7.7	Number of narrowband subscriber lines (per 100 people)	Hard data	56.25	65.00	84.97	51.32	56.91	127.20
7.7	Number of narrowband subscriber lines (per 100 people)	Rank	45	41	28	47	44	6
7.8	Number of broadband subscriber lines (per 100 people)	Hard data	1.00	0.00	9.99	0.04	0.06	15.40
7.8	Number of broadband subscriber lines (per 100 people)	Rank	26	44	14	43	37	6

Data Tables by Topic – Infrastructure continued

Infrastructure Benchmarking Statistics

	Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore	Malta
Source: International Telecommunication Union (ITU) "World Telecommunication Indicators Database" (2003)							
Annual telecommunication investment (US$)	$110,112,360	$233,061,696	..	$137,369,568	$66,323,376	$370,111,744	$31,111,112
Business telephone connection charge (US$)	22	50	112	18	69	17	102
Business telephone monthly subscription (US$)	28	6	16	16	3	7	10
Cellular mobile telephone subscribers per 100 inhabitants	20	8	77	24	23	72	61
Households	346,847	..	1,305,000	722,000	308,000	983,600	131,341
Internet users ('000s - estimated)	120	384	895	100	158	1,700	99
Internet users per 1000 inhabitants	92	98	236	37	132	415	251
ISDN subscribers	158	1,878	..	..	1,412	22,567	864
Personal computers	90,000	700,000	1,500,000	130,000	130,000	2,100,000	90,000
Population	1,300,000	4,113,000	3,838,900	2,599,334	1,200,170	4,131,200	392,000
Residential monthly telephone subscription (US$)	$5	$5	$16	$7	$2	$5	$4
Residential telephone connection charge (US$)	$11	$50	$112	$13	$34	$17	$51
Staff (Total full-time telecommunications staff)	3,128	4,137	16,300	2,599	1,859	8,804	1,970
Television equipped households	296,000	800,000	1,225,000	469,000	276,000	830,659	..
Total telecommunication service revenue (US$)	$298,876,416	$400,367,936	$2,857,142,784	$524,760,864	$144,181,264	$2,748,603,392	$113,333,336
Total telephone subscribers per 100 inhabitants	44	31	126	45	48	120	114

Data Tables by Topic – Human Resources

Human Resources Benchmarking Statistics

			Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore
Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003								
2002 Report:								
1.3	Estimated Internet users per 100 inhabitants	Hard data	3.30	6.21	27.88	2.34	7.34	46.05
1.3	Estimated Internet users per 100 inhabitants	Rank	45	40	19	51	35	6
1.5	Public Internet Access	Survey data	3.30	4.20	3.90	2.70	2.90	5.70
1.5	Public Internet Access	Rank	49	23	30	66	59	6
4.4	Public access to the Internet	Survey data	3.30	4.25	3.93	2.69	2.94	5.68
4.4	Public access to the Internet	Rank	55	23	31	74	65	6
6.1	Investment in employees' development of IT skills	Survey data	4.0	4.7	5.5	3.9	4.9	5.5
6.1	Investment in employees' development of IT skills	Rank	54	40	10	55	27	10
6.2	Quality of IT training and educational programs	Survey data	4.0	4.8	5.6	4.1	3.3	6.1
6.2	Quality of IT training and educational programs	Rank	43	26	9	40	64	5
6.3	Internet access in schools	Survey data	2.9	3.5	4.5	2.8	2.5	6.1
6.3	Internet access in schools	Rank	46	35	24	51	57	2
7.1	Brain drain of IT-skilled workforce	Survey data	4.1	5.3	6.4	4.1	4.2	6.2
7.2	Brain drain of scientists and engineers	Survey data	50	25	5	50	47	8
8.5	Quality of public schools	Survey data	4.6	4.4	6.3	3.9	3.8	6.4
8.5	Quality of public schools	Rank	32	34	9	42	44	6
2003 Report:								
1.6	Public spending on education (% of GDP)	Hard data	3.25%	6.05%	4.48%	6.34%	4.03%	3.07%
1.6	Public spending on education (% of GDP)	Rank	64	19	46	15	54	69
4.4	Public access to the Internet	Survey data	3.30	4.25	3.93	2.69	2.94	5.68
4.4	Public access to the Internet	Rank	55	23	31	74	65	6
4.6	Total adult literacy rate (%)	Hard data	6.23	4.41	2.00	13.13	15.47	7.68
4.6	Total adult literacy rate (%)	Rank	44	39	28	61	67	49
4.7	Quality of math and science education	Survey data	4.62	4.41	5.11	3.37	4.08	6.38
4.7	Quality of math and science education	Rank	40	46	24	65	55	1

Data Tables by Topic - Economy & Finance

Economy & Finance Benchmarking Statistics

			Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore
Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003								
2002 Report:								
9.1	Business to consumer e-commerce transactions	Survey data	2.1	2.1	2.5	1.8	1.8	2.9
9.1	Business to consumer e-commerce transactions	Rank	49	49	28	66	66	11
9.2	Business to business e-commerce transactions	Survey data	2.1	2.0	2.5	2.0	1.8	2.8
9.2	Business to business e-commerce transactions	Rank	52	55	26	55	66	10
9.4	Commercial websites	Survey data	4.2	4.3	5.7	4.0	2.5	6.0
9.4	Commercial websites	Rank	52	49	26	57	26	20
9.5	Domestic venture capital investment in e-commerce	Survey data	4.3	3.4	5.4	4.1	2.9	5.3
9.5	Domestic venture capital investment in e-commerce	Rank	36	58	11	41	73	12
9.8	Use of Internet-based payment systems	Survey data	4.00	3.2	4.3	2.8	3.9	4.7
9.8	Use of Internet-based payment systems	Rank	27	48	21	60	47	12
2003 Report:								
1.1	Venture capital availability	Survey data	3.50	2.36	4.81	2.34	2.9	4.31
1.1	Venture capital availability	Rank	32	68	6	70	58	15
1.2	State of cluster development	Survey data	2.89	2.91	4.33	2.55	2.97	4.82
1.2	State of cluster development	Rank	53	51	10	71	49	6
1.8	Domestic manufacturing of IT hardware	Survey data	60	25	3	68	75	14
4.1	Sophistication of local buyers' products and processes	Survey data	4.67	4.57	5.26	4.53	4.16	5.62
4.1	Sophistication of local buyers' products and processes	Rank	39	41	19	43	52	12
5.1	Firm-level technology absorption	Survey data	5.01	5.21	5.44	4.68	4.61	5.86
5.1	Firm-level technology absorption	Rank	39	28	18	51	55	9
5.3	Capacity for innovation	Survey data	69	32	23	64	57	25
5.5	Quality of local IT training programs	Survey data	4.04	4.84	5.55	4.08	3.31	6.06
5.5	Quality of local IT training programs	Rank	46	27	10	44	70	5
5.6	Cost of business telephone subscription (US$ per month)	Rank	74	33	27	61	8	5
8.1	Use of Internet for coordination with customers and suppliers	Survey data	3.08	3.68	4.02	3.61	2.93	4.63
8.1	Use of Internet for coordination with customers and suppliers	Rank	76	39	21	43	78	5
8.8	Pervasiveness of company Web pages	Survey data	4.17	4.31	5.65	4.00	2.94	6.01
8.8	Pervasiveness of company Web pages	Rank	60	55	32	63	80	22

Data Tables by Topic – Government

Government Benchmarking Statistics

			Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore
Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003								
2002 Report:								
10.2	Availability of online government services	Survey data	1.5	3.2	5.1	3.3	2.1	6.4
10.2	Availability of online government services	Rank	72	50	17	45	65	1
10.3	Extent of Government websites	Survey data	2.80	4.1	5.7	4.0	2.4	6.6
10.3	Extent of Government websites	Rank	68	48	22	50	71	6
10.4	Business Internet-based interactions with government	Survey data	1.80	1.9	2.2	1.7	2.1	2.7
10.4	Business Internet-based interactions with government	Rank	58	53	36	63	44	9
2003 Report:								
6.1	Government prioritization of ICT	Survey data	4.03	4.19	5.38	5.50	5.69	6.24
6.1	Government prioritization of ICT	Rank	58	56	12	10	7	1
6.4	Government online services	Survey data	1.55	3.15	5.09	3.29	2.13	6.36
6.4	Government online services	Rank	79	57	17	51	71	1
9.1	Use of Internet-based transactions with government	Survey data	1.77	1.87	2.18	1.7	2.11	2.74
9.1	Use of Internet-based transactions with government	Rank	66	60	42	71	48	9
9.2	Government online services	Survey data						
9.2	Government online services	Rank	79	57	17	51	71	1
9.3	Government success in ICT promotion	Survey data	3.83	3.84	4.69	3.42	4.31	5.76
9.3	Government success in ICT promotion	Rank	39	38	14	57	23	1

Data Tables by Topic – Legal & Policy

Legal and Policy Benchmarking Statistics

			Trinidad & Tobago	Costa Rica	Ireland	Jamaica	Mauritius	Singapore
Source: World Economic Forum - "Global Information Technology Report" 2001/2002 and 2002/2003								
2002 Report:								
4.1	Internet access cost	Hard data	3.30	5.43	0.91	8.40	5.10	0.84
4.1	Internet access cost	Rank	32	44	17	48	40	14
4.2	Perceived effect of telecommunications competition on quality and price	Survey data	2.6	2.8	4.7	4.0	1.9	6.0
4.2	Perceived effect of telecommunications competition on quality and price	Rank	71	65	38	49	75	11
2003 Report:								
1.3	Competition in the telecommunications sector	Survey data	2.56	2.79	4.65	3.98	1.94	6.00
1.3	Competition in the telecommunications sector	Rank	78	73	41	52	82	12
2.1	Effectiveness of law-making bodies	Survey data	3.39	2.03	4.41	3.61	4.08	6.00
2.1	Effectiveness of law-making bodies	Rank	44	72	15	37	25	1
2.2	Legal framework for ICT development	Survey data	4.38	4.03	5.35	4.29	4.25	6.18
2.2	Legal framework for ICT development	Rank	38	56	14	44	47	2

Appendix C

Working Groups Action Plans

C1. INFRASTRUCTURE ACTION PLAN

Contribution to the National ICT Plan

Over the last twenty years, Information and Communications Technologies (ICT) have become a most powerful force for economic and social transformation in the developed world. The general pervasiveness of ICT, and its accelerated ability to enhance efficiency and facilitate innovation, has made it the largest and most sustained contributor to productivity growth in most of the world's leading economies. E-Readiness rankings are, in this context, an important bell-weather to national growth prospects. Indeed, of the very many factors that position a country to accelerate its development, the strength of its ICT infrastructure is undeniably one of the most critical.

Trinidad and Tobago has established ambitious growth objectives aimed at achieving developed-world status by 2020. The potential for significant additional national revenues from the oil and gas sector makes this goal realistic. But natural resources run out and, long before they do, they can get much more expensive to extract. Profit margins and tax revenues diminish. So, unless the high profits produced in the short-term are harnessed for sustainable development, improvements in development rankings may be only temporary.

On the other hand, an economy founded on the fundamental pillars of skills development, innovative enterprise and productivity improvement makes for steady growth in corporate earnings, employment, living standards and tax revenues. An ICT infrastructure that enables and stimulates significant performance in these areas would rapidly become one of the principal drivers toward a more fully developed economy.

Unfortunately, and as the current e-Readiness Assessment highlights, Trinidad and Tobago's ICT infrastructure is not yet properly

positioned to play this central role in advancing the country's development agenda. The Infrastructure Action Plan has identified actions that need to be taken to help ensure that a robust ICT infrastructure is in place to support the development of the National ICT Plan.

The urgency of the recommendations of this report cannot be overemphasised. Trinidad and Tobago's ICT infrastructure can indeed become a fundamental building block upon which widespread national progress can be built. However, substantial reforms must be implemented quickly and in a determined manner. Otherwise the state of the country's ICT infrastructure would be more appropriately described as an obstacle to development. We are at a pivotal point.

Desired Outcomes and Key Strategies

Desired Outcomes

The Infrastructure Working Group began its deliberations by identifying a number of infrastructure outcomes that would be fundamental to achieving success across the national agenda. Our suggestions included:

- Appropriate technology infrastructure and standards to support current and future ICT needs;
- Improved service standards and accessibility of ICT, and lower costs;
- Increased competition introduced to ICT sector;
- SMEs benefiting from utilisation of ICT infrastructure;
- New ICT businesses established;
- Growing number of jobs in the ICT sector;
- Rationalisation of infrastructure in Government; and
- A proactive, well-supported, and innovative regulator.

These items were combined and developed into a number of strategies, recommended programs and supporting projects.

Key Strategies

By international standards, Trinidad and Tobago has a reliable and affordable fixed line telephone system that meets the basic needs of homes and businesses. This connectivity has been enhanced by the rapid uptake of cellular phone services**,** which are offered through competitive suppliers. However, mainly because of high prices relative to income levels, Trinidad and Tobago is lagging badly in the introduction of computers and Internet access.

With relatively few people and organisations connected, there isn't much incentive to enrich service offerings, provide on-line services or upgrade and extend the telecommunications infrastructure. In the absence of substantial new investment, Internet access speeds will remain low, precluding much in the way of multimedia delivery and further dampening interest in "getting connected".

From an infrastructure viewpoint, Trinidad and Tobago is in somewhat of a conundrum. The country will need a bold, multifaceted strategy and determined actions to get out and going. Here are the decisions that are seen as being the most crucial:

1. Increased competition in the ICT sector

If Trinidad and Tobago is to going to use ICT aggressively for economic and social development it must get more technology into more organisations and homes. The ICT sector must be encouraged to provide new products and services that offer real value at a price that less wealthy individuals and small businesses can afford.

While public programs can play an important role, they are no substitute for competitive market forces. The pre-eminent requirement is to get prices down while simultaneously enhancing service quality and variety. This is best done through the creation of open and effective competition in all areas of the ICT sector.

Overall the Trinidad and Tobago ICT sector is barely open to competitive forces. There is evidence of some competition in the ISP marketplace, with approximately 9 companies providing service. Cellular services are now available from multiple suppliers and new investors are entering the field. The broadcasting sector is very competitive with over 20 radio stations and 4 television providers. The cable system now has two providers although they cover different parts of the country.

While these sectors feature some competition, it is absent in the area of fixed-line telephony, which is by far the most critical segment of the market in terms of fostering economic development though productivity, innovation and skills improvement. If Trinidad and Tobago is to leap forward in its use of ICT for development there are a number of critical liberalisation decisions that must be taken promptly. A five-point program has been crafted. It provides a series of actions that have the potential to move the strategy forward quickly and effectively.

2. A proactive, well-supported and innovative regulator
Implementing and supporting a competitive telecommunications market is a major national undertaking, requiring a highly expert and well-run regulator. It needs a clear mandate from Government, adequate resources to do a thorough job and, perhaps most importantly, freedom from political interference. Foreign investors will not take the Trinidad and Tobago telecommunications market seriously with anything less.

The Government's decision to establish the Trinidad and Tobago Telecommunications Authority (TTTEL) as an independent regulator was implemented in 2001 with the *Telecommunications Act*. While TTTEL already has wide-ranging powers over the telecommunications sector, its mandate and organisation will need to be further strengthened to support the liberalisation activities already committed to by the Government. It is proposed that the Ministry of Public Administration and Information (MPAI) help TTTEL design and undertake a comprehensive agenda aimed at making telecommunication competition and innovation a reality in Trinidad and Tobago as soon as possible.

3. Improved service standards and accessibility of ICT
Generating effective competition by liberalising market framework provisions is the essential first step. However, by itself this will not create sufficient momentum to make ICT a powerful development instrument in the medium-term. Government will need to work with the non-profit and business sector to launch a series of well targeted, affordable and sustainable programs to generate demand for high value-added services that will help build Trinidad and Tobago's economy, society and culture.

We must get ICT technology and services into the hands of many more consumers and producers. And, we need to do this as quickly as possible.

Other Action Plans, particularly those focused on Human Resources and Government, are looking at a range of possible public initiatives to accomplish this. In this context, the Infrastructure Working Group has focused on three areas that deserve priority on the basis that they will immediately help to promote broad-based demand for telecommunications services and so contribute to the business case for more private investment within a liberalised telecommunications environment.

4. Appropriate technology to support future needs

If we are serious about the use of ICT as a major development tool for Trinidad and Tobago, and if we are working to build widespread ICT usage by individuals and organisations, then we have to begin building an adequate infrastructure throughout the country to meet tomorrow's bandwidth and volume needs. Broadband is the fundamental requirement.

There are many definitions about what broadband is with regards to speed. In most developed markets it is considered to be about 1.5 megabits per second of data throughput. This transmission level cannot be easily achieved though the traditional switched telephone service. In the case of Trinidad and Tobago this means that new and expensive infrastructure would need to be deployed by all parties, including telephone companies.

The cost of this investment and the long recovery period in such a small market will make creating broadband access a major challenge in all except the main urban centres. In fact, from a business perspective the rates that would have to be charged for broadband service, at least for the foreseeable future, may be prohibitive for all but the largest customers.

Thorough analysis and imaginative thinking around all the issues and options, including new technologies and innovative public-private partnership models is essential to providing a proper foundation for a National Broadband Strategy for Trinidad and Tobago. We are recommending the establishment of a separate Broadband Task Force unless it is possible to establish a special element of the current NICT Steering Committee with the appropriate mandate.

5. ICT-led growth in businesses and jobs

Whatever form of infrastructure is built for the future it will require a large national expenditure. This level of investment must pay off handsomely in terms of business growth and job creation. With one of the largest and best-educated workforces in the Caribbean, and with perhaps the Region's most diversified and entrepreneurial private sector, Trinidad and Tobago is well positioned to leverage a strengthened ICT infrastructure for economic

growth. We have some suggestions aimed at ensuring that this expansion is as rapid and substantial as possible.

Major Programs and Projects

Increased competition in the ICT sector

Increased competition in the ICT sector
Since the proclamation of the Telecommunications Authority Act of 2001, several initiatives have been undertaken by the GORTT towards the liberalization of telecommunications services in Trinidad and Tobago. Work is underway in establishing the necessary Regulatory Framework viz. the formulation of the required Rules and Regulations for promulgation the Telecommunications Act. This will ensure that the proper legal, technical and administrative framework is instituted prior to the introduction of full competition in the telecommunications sector.

Competition in the cellular, broadband and cable segments of the ICT market is planned for introduction by mid 2004.

Based on the above, this Action Plan proposes a five-point approach to the introduction of competition for other telecommunications services.

Acceleration of Telecommunication Liberalisation
Firstly, the Government should initiate all necessary action to end the monopoly over both the local telephone system and local telephone services. The objective should be for open fixed line competition to commence by 2005 with a call for new market participants. Locally owned market participants and those with international links should be encouraged.

Competition in International Telephone Connectivity
Secondly, the exclusive rights to switch international telecommunications should be removed from TSTT, the existing monopoly provider. By virtue of this monopoly, high prices for international voice and data traffic, including Internet services, are maintained. The Government should move to open the international connectivity field to other players, including satellite service providers.

This new competitive regime should also be in place by 2005.

Interconnection
Thirdly, as would exist for new cellular providers, interconnection to the dominant carrier i.e. TSTT should be available to any new providers of various telecommunications services. The same principle of interoperability will need to be applied and enforced to facilitate and enable seamless interconnection of various service providers. The Government should develop a suitable policy in consultation with the public, particularly experts in the business and academic sectors.

Access to Current Infrastructure
Fourthly, real competition in the fixed line area will only occur if competitors have access to existing telecommunications infrastructure, including poles and conduits, on a fair market basis. The resale of capacity and access to facilities must be a reality in the short term. This includes the access to telecommunication and cable facilities. It will also be necessary to clarify other essential conditions to preclude constraints to competition such as the right of competitors to co-locate telecommunications equipment on TSTT premises for a reasonable fee. The Ministry of Public Administration and Information will undertake all necessary policy work in this area and will engage expert assistance if necessary.

Encouraging Entrepreneurial initiatives
Finally, in moving forward in other areas of telecommunications development in Trinidad and Tobago, the Government should abide by the principle of competition. Where sufficient progress may not occur due to the high cost of entry, the Government should give preference to other options, such as competitively tendered public-private partnerships, over the provision of exclusive mandates.

A proactive, well-supported and innovative Regulator

Reinforcing the Regulator
As an independent regulator Trinidad and Tobago Telecommunications Authority (TTTEL) is less than three years old. Overseeing the competitive transformation of the telecommunications sectors has proven to be a daunting task, even in countries where independent regulators have been the tradition. TTTEL will need support from the most senior levels to create the necessary framework with appropriate staffing in order to develop and implement an agenda to achieve a competitive telecommunications environment.

TTTEL will need to have robust policies and processes in place in many areas, including:

- Establishing the necessary regulatory framework to introduce competition;
- Establishing parameters for new entrants to the telecom market;
- Reviewing existing policies in the context of competitive telecom provision, e.g., universal service provision and rate balancing;
- Establishing high standards for expert analysis and use appropriate technology regarding competing bids;
- Developing regulations for a competitive marketplace;
- Establishing a mechanism for constant review of regulations.
- Establishing the rules for phone number administration and portability;
- Ensuring provisions for enforcing compliance with policies and standards;
- Establishing robust and open appeals and dispute arbitration processes;
- Establishing means of identifying and addressing anti-competitive activities;
- Creating an environment encouraging research in technology, business models, performance standards and regulatory practices;
- Establishing stakeholders' fora;
- Establishing a complaints resolution mechanism.

Even though this is not a comprehensive list, it is already a very ambitious work programme. Clearly a great deal of emphasis needs to be placed on preparing an adequate budget to support the expansion of staff and other resources.

It is recommended that the Ministry of Public Administration and Information secure expert technical support to help TTTEL develop its programme and plans for supporting and regulating a fully competitive telecommunications market.

Improved service standards and accessibility of ICT

Making ICT More Accessible

A more competitive ICT sector will go a long way toward making advanced telecom and Internet services more affordable. But price is not the only hurdle that must overcome. ICT awareness and skills need to be fostered on a nation-wide basis. Public programs have an important role to play in at least three areas:

Community Connection Programme
First, a concerted Community Connection Programme (CCP) will play a key role in improving ICT awareness and accessibility. Properly equipped and staffed, community access sites have been shown to be very effective in exposing a large number of people to the benefits of ICT and the basic skills needed to utilise it. Additionally, as the new ICT demand, which Community Access Centres create, arises from many communities, numerous businesses, including small local ones, get to participate in servicing it.

These local suppliers of computers, software, Internet, installation and repair services and training become, in turn, the customers of larger domestic companies. This upward acceleration of the marketplace can have a much more powerful growth impact than would occur if demand expands only gradually and is satisfied by only a few large retailers.

Accordingly, purely from a market perspective, this Action Plan strongly endorses the recommendation of the Human Resources Working Group calling for the establishment of a large-scale deployment of Community Access Centres throughout the country. Consideration should be given to housing these centres in schools and libraries will help keep costs down and improve the prospects for sustainability.

Special emphasis must be placed on ensuring that the teachers and facilitators at the community centres are equipped with the necessary knowledge and experience to train and develop the people of the community.

School Connectivity Program
Another proven way to simulate ICT demand among non-users is to demonstrate its benefits in helping students learn. Many countries have experienced a rapid increase in computer, software and Internet sales following the introduction of a school connectivity program. Equally important, the extensive use of networked computers in classrooms will help build the "new economy" skills that are crucial to the objective of nurturing a more innovative and productive economy and a more open, collaborative and stable society.

This Action Plan strongly supports the recommendation for a national school networking program that will see all schools supplied with sufficient equipment, connectivity and technical support as to make the classroom use of computers meaningful from a teaching perspective.

Increasingly, broadband connectivity is required to meet this objective.

ICT Awareness Building and Technical Support with SMEs
A third priority initiative involves helping the large number of small business and non-profit organisations that currently use ICT only marginally, if at all, to become more aware of its operational advantages. There are a number of ways that this organisational ICT awareness building can be fostered and each has their benefits. Government could subsidise the provision of ICT training centres in urban locations and travelling ICT services in rural areas. Alternately organisations wishing to receive ICT assistance and fitting a certain profile could be given vouchers to acquire the services commercially where they exist. Faced with a similar challenge, the Government of Canada launched a partnership program, Student Connections, with the ICT sector and the university/college community to place specially trained students, at subsidised wages, in small and medium-sized companies.

While there are many program options, the key to success is to discuss needs with the client communities to determine whether such programs would be useful and how they should be offered. It is important to ensure that the special circumstances of the non-profit sector are identified and taken into account in program design.

In response to Government-assisted efforts to generate new demand, the ICT sector has the responsibility to consider innovative service packages that will better enable less-wealthy individuals and business customers to derive value from all aspects of the telecom marketplace. Obviously, marketing and pricing strategies are very competitive but segments of the industry could collaborate on designing and funding market surveys and could help refine service offerings and standards for the sector as a whole.

In order to provide support and ensure that the citizens are protected it is necessary to develop and enforce appropriate service standards.

ICT suppliers should also be open to sector-wide collaboration in the development of a national marketing campaign with Government that will raise the overall profile of ICT in the minds of citizens and consumers. Maintaining a strong public and political commitment to ICT accessibility is a big part of ensuring national success in its use.

Appropriate technology to support future needs

National Infrastructure Taskforce and Broadband Strategy
Why should a country with a small population, low computer and Internet penetration levels and fledgling ICT sector be talking about broadband? Why not just build telecom infrastructure incrementally as it is needed? Anyway, how can we afford broadband when so many other needs must be met?

There are many such questions about whether broadband connectivity is needed and can be afforded by Trinidad and Tobago. As other countries have found, the answers can be surprising. Some kinds of broadband networks are now less expensive to build and operate than narrowband ones.

New telecommunications technologies and business models have emerged that are giving countries, particularly small ones, new, exciting and affordable choices. For instance, on a total cost of ownership basis, broadband networks can sometimes pay for themselves in less than seven years compared to existing narrowband services. Connecting big public bandwidth users like health and education facilities with narrowband networks may actually be building in technical bottlenecks that will preclude effective ICT use within a few years. This can require a complete rebuild at a high and unnecessary cost.

However, all models have their advantages and drawbacks. It is often difficult to determine the relevance of particular solutions to specific circumstances like those in Trinidad and Tobago. Accordingly, we need a National Infrastructure Task Force with a mandate to look at all the options and recommend a Bandwidth Strategy (such as Broadband) that will make sure that we have the future-oriented infrastructure platform from which to leap forward. We recommend the Task Force give the Government its recommendations by the end of 2004.

A National initiative is necessary to start this process and so the Government should facilitate technology development.

Harnessing ICT for Jobs and Markets
How do we ensure that a more competitive telecom environment and new investments in ICT translate into profitable business opportunities and more jobs? This Action Plan presents some suggestions for Government, business and academia.

e-Commerce Strategy and Programme
On the business front, there are several important opportunities. First, we must ensure that, with the accelerated deployment of lower cost, high bandwidth and more sophisticated telecom services, a much larger percentage of Trinidad and Tobago businesses are engaged in electronic commerce. Given the current low level of awareness about e-Commerce and how it can help extend markets, create closer supply linkages and improve productivity, the first major requirement is for a concerted E-Commerce Strategy and Program. This program should be jointly designed and delivered by Government and business. It should address a broad range of topics aimed at encouraging, by 2008, at least 50% of Trinidad and Tobago businesses to get connected and use e-Commerce solutions to improve business operations. In this context the programme should cover, inter alia:

- Accelerating legal, regulatory and infrastructure (Registration Auth and Certification Auth) progress in such areas as digital signatures, Public Key Infrastructure (PKI), trust and security;
- Establishing the lead authority on the management of domain names from within Trinidad and Tobago;
- Research on best practices in leading e-Commerce jurisdictions and on technical developments;
- Developing a consultation process with the construction and real estate market around smart building technologies and standards;
- Business opportunity identification activity aimed at finding areas in the e-Commerce domain where local business can develop niche markets;
- Technology diffusion and training to facilitate the adoption of e-Commerce solutions;
- Communications and awareness aimed a building an understanding of the value of and market for e-Commerce services;

- A procurement review of upcoming e-Government and e-Commerce requirements so that domestic firms can better participate in contracts; and
- An applications development support program that can, where needed and on a business case basis, help develop or acquire technology to foster new Trinidad and Tobago e-Commerce operations.

Small Business e-Commerce Application Development

Given the low rate of ICT skills in most Trinidad and Tobago businesses it is unlikely that most firms will be able to adopt disaggregated e-Commerce solutions. Therefore another opportunity area lies in creating or adapting an integrated e-Commerce application for widespread use by small businesses. This application would contain storefront, shopping cart, payment, back office, accounting and training software and content. Government could assist the business community by helping to underwrite the costs of designing and developing the application or by subsidising its initial purchase by small business.

Rather than licensing it for independent use, the application could be provided through applications service providers.

ICT Sector Expansion Strategy

A third opportunity area is the creation of a strategy for expanding the ICT sector itself. The preceding recommendations on telecommunications competition and infrastructure development will provide a powerful stimulus to local ICT suppliers. However, as the domestic market will always be small, it is imperative to leverage short-term increases in demand to establish areas where Trinidad and Tobago can be competitive regionally and globally in the medium and long-term. This will require a careful analysis of established and emerging ICT markets in areas like call centres, software development, ASP activities etc.

Increasing ICT Education and Training Programs

Trinidad and Tobago has only a limited supply of ICT-trained personnel and unfortunately for T&T, many people with these critical skills soon find attractive employment abroad. Skills shortages in key areas like computer and network support, information management and software development could seriously impede the ability of Trinidad and Tobago firms to respond both to the more aggressive use of ICT or to new market opportunities in the ICT market. Accordingly, it is important that the high school and post secondary education systems respond to the NICT Plan with new course offerings and increased placement in ICT-related disciplines. Vocational

and technical ICT training programs should be significantly expanded. Attention should also be given to creating ICT elements within business and other programs to better prepare graduates for the entrepreneurial opportunities that ICT presents.

Internship Programs

Government and the ICT business community should give consideration to developing internship and cooperative placement programs with the University of the West Indies and community colleges. Giving students early opportunities to gain work experience in the ICT field will encourage students in ICT-related studies and help retain them in Trinidad and Tobago upon graduation. As already mentioned, the scope of this initiative can be greatly expanded by providing some sort of wage subsidy thereby allowing smaller firms to hire ICT trained students to support their adoption of computers and the Internet.

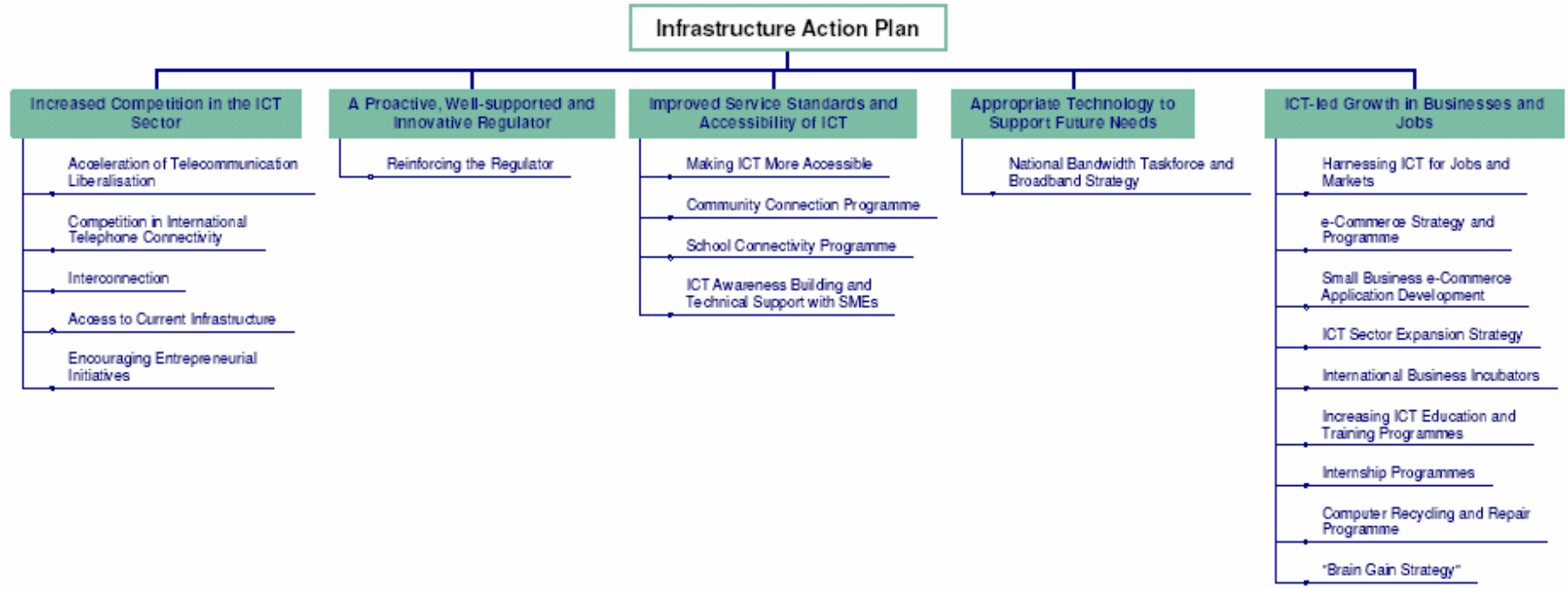
Computer Recycling and Repair Program

Another area with short-term job creation potential is computer recycling and repair. Low cost refurbished computers could be an attractive option for an initial purchase by many small businesses and families. North America is replete with high quality pre-owned ICT equipment. A way to stimulate local repair and recycling businesses would be for the Government to agree to purchase a percentage of the equipment it will need for schools, libraries and Community Access Centres from recyclers. As computer ownership becomes more widespread, small local recycling and repair businesses will naturally migrate into software installation, network troubleshooting and on-site equipment maintenance. This sort of ICT micro-enterprise is now a vibrant component of many small communities in North America.

"Brain Gain Strategy"

Finally, another aspect of the job creation challenge is to retain qualified people in Trinidad and Tobago and to attract back those who have left, especially when they have scarce skills. Powerful ICT applications now exist to facilitate the recruitment and placement of scarce talent and to link them with potential employers and Government immigration services. A review of some best-of-breed tools may be worthwhile.

Appendix: Infrastructure Action Plan "Key Strategies, Programmes and Projects"



C2. Human Resources Action Plan

Contribution to the National ICT Plan

Human and intellectual capital is now deemed as the most important resource for many developing countries – particularly those with limited, extraction-based, economies such as Trinidad & Tobago. ICT provides an outstanding mechanism for leveraging human and intellectual capital and for maximising social, economic and cultural benefits through the creation, exchange and knowledgeable interpretation of information. As Trinidad & Tobago further advances into the global information-based economy, it is paramount that there is a well-educated labour force, skilled in all aspects of ICT. It will be important not only to focus on creating training opportunities but also on promoting a national environment that is conducive to job creation and job enrichment in an effort to discourage the migration of skilled workers to more developed nations.

Developing proficiency in ICT should now be regarded as important as basic reading and writing skills. In order to advance ICT literacy among the entire population, ICT will need to be incorporated into the formal education system. However it is important to understand that this extends far beyond simply putting computers in schools. Maximum use and benefits will only be achieved through corresponding changes in the approaches to teacher training, curriculum development, and administration.

The aim of the Human Resources Working Group ICT Action Plan is to identify the major programmes and projects that will help develop and sustain a flourishing knowledge-based society in Trinidad & Tobago. In the relatively near future everyone within the country will have simplified access to ICT and will be able to understand and effectively use ICT in all aspects of their social, domestic and professional lives. The Plan will pay particular attention to education and the development of ICT related skills in children to ensure a sustainable solution. Engaging support from teachers, the Ministry of Education, the Ministry of Science Technology and Tertiary Education and the broader

community will be a critical component in achieving an effective and uniform take-up.

Desired Outcomes and Key Strategies

Desired Outcomes

At the outset of the project, the Human Resources Working Group identified a number of HR related outcomes that were felt to be important in determining the overall success of Trinidad & Tobago's national connectivity agenda. These included major outcomes such as:

- All schools and libraries to be connected;
- ICT training and education to be fully integrated into the school curriculum – as a tool and as content;
- Standardised measures of ICT proficiency;
- Universal access made available through Community Access Centres;
- Business opportunities to exist for ICT workers;
- All Government workers on-line and ICT literate; and
- An appropriate body organised, and in place within one year to manage ICT development.

1. Providing Universal Access

This strategy aims to provide everyone in Trinidad & Tobago with affordable, preferably free, public access to the Internet. With the combined efforts of Government, community groups, social agencies, libraries, schools, volunteer groups and the business community, the strategy will help everyone, wherever they live, take advantage of emerging opportunities in the new global knowledge-based economy. The strategy aims to use public locations such as schools, libraries and community centres as "on-ramps" to the global information society, and provide computer support and training for users where required. It is important to understand that "universal access" takes into consideration participation and accessibility for all individuals whether they are blind, using a wheelchair, hearing impaired, families with young children, temporarily using mobility aids (such as crutches), senior citizens or otherwise.

2. Developing and Sustaining a Knowledge-Based Society

In order to create a knowledge society, every individual must have the opportunity to participate in and contribute to the development of such a society, at whatever level is relevant and appropriate to the individual. This strategy is the lynchpin to the country's entire ICT agenda. It will be achieved through identifying, designing and implementing education and training programmes for all segments of the population – including teachers – and preparing students to be functional in all aspects of an ICT-dominated world. All schools will be equipped with computers and Internet access to facilitate uniformity of education, improve overall educational standards and allow students and educators to work collaboratively regardless of location. ICT will be used both as an educational tool and as a subject in its own right. Programmes will be put in place to ensure that ICT education is formalised into the general curriculum and that the educational, social and economic benefits resulting from ICT investments are clearly identified and measurable. This will include monitoring the number of new ICT-related jobs and opportunities that are created and assessing the effectiveness of incentives and initiatives aimed at preventing the loss of ICT professionals to other countries.

Libraries will play an important role in Trinidad & Tobago's knowledge society. All libraries will be equipped with computers and Internet access and all relevant information will be digitised.

3. Increasing Awareness, Promotion and Sensitisation

Successfully moving Trinidad & Tobago further into the global information society will require far more than installing computers and providing Internet access. Citizens and businesses will need to be aware of what the Internet is, how it can be best used, where they can find access and assistance if they require it, etc. An effective promotional campaign will need to be designed to stimulate increased take-up and encourage greater on-line interaction. Financial and other forms of incentive may be required to foster individual and corporate investment in ICT. Success stories and lessons learned will need to be shared and used as stepping-stones to even greater achievements. As the benefits of T&T's connectivity agenda take hold, the country will need to find innovative and compelling ways to present itself as an emerging player in the new knowledge-based economy. Done well, this will lead to new investments and greater economic prosperity.

Obviously, it will be important to avoid unnecessary hype and over-promising on the potential benefits of increased levels of connectivity.

However the impact of effective promotion and awareness can be substantial. It is felt to be a critical component in successful ICT development - unfortunately it is often overlooked or poorly executed. It is likely to require specialist assistance to be most effective.

Major Programmes and Projects

Providing Universal Access

Community Connection Programme

The aim of the Community Connection Programme (CCP) is to provide residents of rural, remote and urban communities with affordable access to computers and the Internet in places like schools, community centres and libraries. It will provide access to those people who might not have computers or Internet access in their homes or workplaces.

With the combined efforts of government, community groups, social agencies, libraries, schools, volunteer groups and the business community, CCP will help everyone in Trinidad & Tobago, wherever they live, take advantage of emerging opportunities in the new global knowledge-based economy. Under CCP, public locations like schools, libraries and community centres will act as "on-ramps" to the global information society, and provide computer support and training wherever required.

The programme should be viewed as a community development tool. It will be used to enhance quality of life, facilitate cultural development and heritage preservation, accelerate communication between individuals, expedite interaction between the citizen and government, improve economic performance, provide new educational opportunities, and provide youth employment. CCP will provide everyone within Trinidad & Tobago with a new way to learn, and do business in today's knowledge-based economy.

The programme will have a significant impact at the grassroots level and will become an important economic and social development tool in communities. It is hoped that Community Access Centres will increasingly join together in networking opportunities enabling them to pool resources and form networks to be able to offer even more to their communities.

The Community Connection Programme will pursue the following objectives:

- To promote public awareness of the benefits and opportunities of using information technology and services;
- To help citizens become better informed through the exchange of ideas and information;
- To provide training for individuals in the use of information technologies;
- To support on-line delivery of government programmes and services;
- To facilitate business activities such as electronic commerce;
- To conduct on-line learning and research.

A number of projects will need to be launched in support of the Community Connection Programme including:

Site Location Assessment

Wherever possible, Community Access Centres should be collocated with schools, libraries and other community-based centres that have computers and Internet connectivity, as this will ensure best use of human, technical and financial resources. Of course this will not always be possible. A project will need to be established to identify those CACs that can be located with schools and libraries and a mechanism for selecting other areas of the country that are candidates for stand-alone Community Access Centres. There will need to be a formula identified to ensure consistent levels of access (time/distance to CACs etc.) for all citizens.

Service and Content Toolkit

Every Community Access Centre (CAC) will be unique. The composition of services offered will depend on community needs and available resources. Other factors may include the proportion of the population represented by young people, seniors, professionals, the unemployed, and those that have little or no Internet experience. As a rule, CACs should provide users with access to the following types of information and services:

- Local and community information and services;
- Information regarding jobs, health and education;
- On-line learning – particularly in the area of ICT education
- Business information and services – especially for start-up and Small and Medium Enterprises (SMEs)

- Government services
- A section specifically tailored to the needs of children
- A section specifically tailored to the needs of senior citizens
- Hands-on training for basic ICT skills

There are a number of basic computer and Internet training programmes freely available on the Web that can be evaluated and employed by CACs. However, as site users become more experienced, many will want to enrol in more formalised training that will help acquire a skill recognised in the labour market. The CCP will be in a good position to negotiate relatively low cost licenses to various courses that can be delivered through individual sites for a fee. This may also help a number of CACs generate important sustainability revenues.

A project will need to be launched to develop a Service and Content Toolkit that can be used to assist communities in identifying appropriate information and services for their CAC. Advice regarding protection from offensive or illegal information will also need to be developed, most probably in conjunction with the Legal and Policy Working Group.

Computer and Connectivity Requirements

CACs will play a vital role in extending access to education and training systems and in facilitating the distribution of on-line government services – all important national priorities. To do so they will need a sufficient quantity of up to date computers, reliable high-speed connectivity and capable on-hand technical support.

To gauge the most appropriate level of technical infrastructure for CACs, it is important to establish some reasonable programme metrics. Considering that T&T's current level of Internet access is low, and the aim is to ramp it up quite quickly, a reasonably large number of CACs will be required within the first few years of the programme. A ratio of 2,000 people to one CAC site would mean about 600 sites would be needed within, say, five years. More research will need to be carried out in this area.

The amount of computer equipment will obviously vary with the size of the site and the expected demand from the community. Even the smallest sites require about 5 machines in order to allow a reasonable level of computer literacy training and Internet access. On this basis, an average of 15 computers per site will probably be needed initially.

These computers will have to be networked to an Internet-connected server and printer at every location. Each computer and server will need to have a licensed operating system and a suitable applications suite to support word processing, document creation, Web browsing and more advanced applications like e-learning. Open source software is fully adequate to handle basic requirements of this sort, thus avoiding much of the licensing costs.

A large number of users downloading a lot of data generate major bandwidth demand. Fast download speeds are particularly important to support advanced applications with dense digital content like e-learning and e-Government. For connectivity planning purposes it is reasonable to assume a minimum speed of about 128 kbps per active network user and a ratio of one active user for every ten available computers. This means that most of the smaller CAC sites, with five machines or less, will be able to rely on available 56 kbps dial-up connections. However, CAC sites with more than five computers are likely to face congestion problems even at the beginning of the Programme.

Technical support to the CAC sites to maintain the computers, software and network connections will also be essential. While hiring local talent to provide technical support of the sites will be an important option, these skills may simply not be resident in many of T&T's smaller communities and, accordingly, the time and cost incurred will be higher than the norm. For planning purposes, it is probably prudent to estimate one technician for every five centres and to provide an appropriate budget for parts and software upgrades.

Meeting the computer and networking needs of Connection Centres on an affordable and sustainable basis is one of the great challenges faced by those trying to close the Digital Divide. Trinidad and Tobago has an opportunity to think creatively about how it can create synergies across a number of connectivity silos so as to reduce costs, enhance benefits and, in so doing, leapfrog other nations. There are strong linkages here with the deliberations of the Infrastructure Working Group.

Identifying Accessibility Requirements

It will be important for CACs to be fully accessible for all members of society. This includes those with mobility disabilities, the deaf or hard of hearing, the blind or those with low vision, citizens with learning difficulties or communication disorders etc. Accessibility parameters for Community Access Centres will need to be identified and built into the design of all sites. Accessibility requirements will need to address three important considerations:

- Physical Accessibility – parking, ramps, doors, lighting, signage etc.
- Computer Station Access – table height and width, turning space, workspace design, lighting etc.
- Assistive technologies – including access technology, special education technology, adapted computer technology and assistive technology

It will be important for this project team to seek the participation and contribution of people with disabilities during the design of the CAC accessibility requirements.

Centre Management/Volunteers/Training/Security

To function effectively, CACs will need to be staffed by computer literate people with good communications skills. It will be natural for people who are not very familiar with information technology to be somewhat intimidated initially. There are many proven techniques used in telecentres world-wide that can be borrowed and employed to build interest and usage. The CAC programme will need to work with community organisations to define awareness and training programmes that fit the interests and needs of the various user groups.

Many countries are meeting their CAC staffing needs by engaging young people to work alongside community volunteers to undertake site technical support, training and management responsibilities. Properly selected and trained young people can perform these roles very capably. At the same time, relying on youth to staff CACs creates entry-level employment opportunities that can translate into continuing employment in the ICT sector. Planning for the CCP should include a Youth Computer Corps involving at least one youth for each CAC on a continuing basis. Young people placed in these positions would need to go through a formal certification programme allowing them to provide high quality services and advice in a number of areas such as computer training, Internet training, e-Commerce training, technical assistance for small businesses, website design, troubleshooting etc. Successful candidates may well be computer science students interested in the Internet, but there will also be opportunities for students studying business, marketing, communications, administration and education.

Developed in conjunction with communities, a Guide to CAC Management would help identify the necessary administrative

requirements to successfully establish and run a well-functioning Centre. The guide should provide information on incorporation, hours of operation, access to Internet applications, acceptable use policy, financial management practices, security, health and safety, promotion and publicity etc.

The key to any well-run, sustainable CAC will be the staff and volunteers who provide the support required to run the site. Skill requirements and job descriptions will need to be developed, as will procedures for reference and background checks. At a minimum, volunteers must be responsible, well respected individuals from the local community. They should be in good health, polite, demonstrate good interpersonal skills and have a familiarity with technology. A guide to attracting, recruiting and retaining volunteers would be very helpful.

Sustainability Planning

Planning the ongoing viability and financial sustainability of the Community Connection Programme is of extreme importance and must be designed at the earliest possible opportunity. The sustainability planning exercise will need to examine a wide variety of topics such as:

- Provision, upgrading, repair and replacement of computers;
- Provision, upgrading, repair and replacement of furniture, workstations etc.;
- Fees and charges for use of the CACs;
- Fees and charges for training and technical assistance;
- The role of government; and
- The role of the private sector.

Developing and Sustaining a Knowledge-Based Society

Knowledge, Innovation and Development (KID) Programme

The educational development of Trinidad & Tobago's children for ongoing success in the digital era is the pivotal component of country's National ICT Strategy. Consequently, ICT education, with ICT both as a tool and as content, must now feature prominently throughout the nation's educational system.

The policy arguments in favour of the early introduction and effective use of information technology in education are straightforward and compelling:

- Nations aspiring to higher standards of living need to be more productive and creative than the norm;

- Information and communications technology is now one of the greatest sustained contributors to improvements in productivity and innovation in all segments of the public and private sectors;
- A management and labour force with advanced skills in ICT will be more competitive in developing and applying computer-based solutions to production problems and product opportunities; and
- Exposing young people to computers and the Internet in their formal and informal education will help prepare them to be highly productive citizens, workers and mangers.

Not surprisingly, schools and libraries now figure very high on the priority list in national ICT plans in virtually every developing country. Having said that, many countries have not been very effective in implementing their school networking programmes. A lot of money can be spent for only modest improvements in learning performance and skill development. Trinidad and Tobago has an opportunity to learn, and benefit, from the mistakes of others.

The fundamental lesson learned by other ICT initiatives is that focusing too much attention and money on ICT infrastructure can get in the way of what needs to be done to use networked computers effectively in the delivery of quality education. The real challenges lie in areas such as curriculum reform, change management, teacher training and content development.

The Knowledge Innovation and Development (KID) Programme will be a cornerstone of T&T's connectivity agenda. It will comprise of a large number of projects and will need significant resources for it to be delivered successfully. Initial projects will include:

SchoolNet
The aim of this project will be to connect all of the country's schools to the Internet by 2008. The project will examine the timing, sequencing and technical requirements needed for full school connectivity.

Ideally a school-networking infrastructure, while it will be expensive and challenging to implement, should be largely transparent and immaterial to the student, principal and teacher. It should be:

- Sufficiently powerful to bring new learning resources and learning opportunities to the schools (not just adequate to support current educational applications and materials);

- So affordable that it can be used without constraint in response to the learning needs of students and teachers;
- Completely reliable and trouble-free so that it doesn't impede effective teaching and complicate classroom management, and
- Flexible enough to accommodate rapid growth in usage as students and teachers come to rely on it as an increasingly important aid to learning.

Creating these conditions will require careful analysis of the ICT needs of the school system as a whole, the infrastructure options that are available and their applicability and affordability in Trinidad and Tobago. Ironically, as is being demonstrated in a growing number of school jurisdictions abroad, new technologies and techniques make it possible to create the desired school ICT conditions at less overall cost now than just a few years ago.

The fundamental starting point is to define the basic ICT needs of the schools system. Based on experience in North America and Europe, effective ICT-based teaching methods generally require a student to computer ratio of around 7 to 1 or somewhat lower. Integrating the Internet into a student-centred learning model involves extensive Web-based student research, use of on-line learning resources and collaborative learning. These activities require a basic minimum transmission speed of about 128 kbps per networked computer. This means that schools with about 80 students and up require network access at broadband levels while schools with smaller populations can rely more on narrowband delivery. However, because broadband access allows for a completely different configuration of school local area networks, it may be much more cost effective to link all schools with broadband whether they need this speed at present or not.

Dedicated fibre-based networks go a long way to creating the ideal conditions for school ICT use. They offer enormous bandwidth that is able to accommodate all present and foreseeable needs for educational ICT use. Once built, they are economical to operate and maintain, which allows for "always on" bandwidth to be provided very inexpensively.

As Trinidad and Tobago is aiming to accelerate its rate of development by using ICT aggressively and effectively, it will need to think carefully about how to avoid the many serious problems that developed countries have encountered in implementing computers and the Internet in schools and classrooms. In this context, the broadband option needs to be thoroughly examined from a cost-benefit standpoint. There are strong linkages here with the deliberations of the Infrastructure Working Group.

Other important components of the SchoolNet project will be to ensure that there is equity in the way schools are selected for inclusion in the programme and to coordinate the partnership and collaboration between the various stakeholders that will be involved in the management of the SchoolNet initiative. Developing methods to standardise and measure ICT proficiencies will need to be examined and identifying which schools are well positioned to serve as Community Access Centres will also need to be addressed.

Computers for Schools

SchoolNet, LibraryNet and the Community Connection Programme will all need to develop a mechanism for collecting, upgrading, repairing and replacing computers if the programmes are to have any form of longevity. The Computers for Schools (CFS) project will examine the feasibility of government and private sector organisations "donating" surplus computers for use in schools and communities. As a motivation for organisations to donate used computers to the programmes, it may be necessary to examine financial or other incentives to acknowledge contribution and to strengthen partnerships.

In addition to providing essential components to assist with classroom learning, the CFS project can provide a series of other benefits. It can provide scores of young people with an opportunity for job experience in repairing computers in CFS repair labs. These labs (supervised by experienced IT professionals) could provide early employment opportunities for recent IT graduates who, so often, experience the no job without experience/no experience without a job conundrum. School-based computer repair workshops could also be incorporated into the general curriculum providing real-world skills for students currently in the school system. Repairing and reusing fully serviceable computers that would have otherwise been scrapped will also yield environmental benefits by keeping, potentially toxic, IT waste out of landfill sites.

Curriculum, Content and Training

ICT is a critical instrument in helping countries move to a knowledge-based economy. It can make at least three fundamental contributions.

First, ICT skills themselves are increasingly essential for productive employment in an advanced industrial and commercial economy. Early and reasonably intense student exposure to computers, software and the Internet is required to build competitive skills.

Second, knowledge-based economies place a premium on creativity, collaboration and communications skills. Nurturing these capabilities requires new approaches to teaching and learning focused around student-centred pedagogy, such as the Canada's SchoolNet GrassRoots programme. While there are many elements to a successful instructional transition, adequately networked classrooms can facilitate and accelerate the process greatly.

Third, knowledge economies are based on continuous change. Learning is now a life long process and skills must be constantly refined and expanded. A networked education system is much more accessible and motivating in this regard. Clients can get to the system's resources and help more easily. ICT helps increase learning participation rates.

However, these benefits can only be achieved if the curriculum, content, pedagogical and administrative pillars of the education system are repositioned to take advantage of technology. It is important that this reform process not be predominantly focused on the technology and its possible productivity impact. Rather it should be primarily about how educational networking can help administrators, teachers, students, parents and the community to derive much more human and community capacity building benefits from the learning system and what changes need to be undertaken to achieve these.

In this respect, consideration should be given to undertaking an e-Readiness review of the Trinidad and Tobago education system. This review should identify, inter alia, where and how curriculum, content, pedagogy, student evaluation, teacher training, technical support, performance evaluation may need to be adjusted to take full advantage of a more ICT-intensive approach to education.

Skills & Knowledge for the Information Era (SKIE)

A major outcome for the National ICT Strategy is the creation of additional ICT employment opportunities. The Skills & Knowledge for the Information Era (SKIE) Programme will include a series of projects aimed at training and job creation for those outside of the formal educational system – with a special focus on adult training.

LibraryNet

Life long learning is built on a strong foundation of literacy. While reading skills are usually acquired in schools, libraries play a critical role in nurturing

these skills and supporting adults in their continuing educational needs. The knowledge management skills acquired by librarian's position them well for supporting citizens, organisations and communities in raising awareness and building capacity in ICT skills. In this context, it is important that libraries in Trinidad & Tobago figure prominently in the implementation planning for the National ICT Strategy. LibraryNet will develop a programme to ensure that all libraries in the country are connected to the Internet by 2008. Libraries will receive the same degree of technology, training and support as the SchoolNet project. Experience elsewhere suggests that libraries also make excellent sites for Community Access Centres and close interaction with that initiative must be maintained to avoid unnecessary duplication of resources.

Electronic Heritage Project

The Electronic Heritage Project, based on the highly successful Canadian Digital Collection initiative, would look to digitise important national heritage collections and place them on the Internet. In addition to capturing valuable cultural information and making it available to everyone, the project would contribute to electronic curriculum content, and create employment and skill development opportunities for those tasked with creating the digital and multimedia images.

Historical Connections Initiative

This project would look to have young and older citizens work together to develop an important online historical and cultural record of stories, folklore and genealogy that can be accessed and enjoyed by everyone. The objectives of the Historical Connections Initiative is to develop communication and technical skills in the young and the elderly, to foster intergenerational learning, to create an on-line historical and cultural resource and to provide schools and Community Access Centres with an informative educational activity.

Campus Connect Initiative

Another key element to a more ICT education system is the post secondary education system. With one of the main campuses of the University of the West Indies being situated in Trinidad & Tobago, there would seem to be at least three important opportunities to be considered. First, strengthening the network on the St. Augustine campus would increase student access to information technology and training in this field, and would lead to more ICT capacity in the graduate population and general workforce. Secondly, the university network could possibly be linked to school, library and Community Access Centres to expand access to post secondary studies through access to on-line distance

education across the country. Third, powered by an advanced network, the St. Augustine campus of UWI could play a lead role in terms of helping to expand access to post secondary studies across the region. In short, distance delivery of post secondary education could have important domestic as well as international benefits that should be carefully explored.

SkillNet

SkillNet is a project that will examine the development of a network of on-line services and tools aimed at helping employers and job seekers use the Internet for recruitment, career, labour information and learning. The project will be government sponsored and designed in partnership with industry sector councils, associations and the private sector to meet the needs of specific industry groups or sectors.

Private Sector Training

An additional mechanism for developing ICT skills in the general population is through training provided by private sector organisations to their own employees or delivered by private companies under contract. Of course the diversity and cost of such training varies widely but a common trend is toward computer and network-based delivery. For employers there are strong productivity arguments in favour of electronically supported training. Individuals also find ICT-based training compelling because it can allows them to progress more quickly than traditional group training in classrooms. Another interesting feature is that computerised training is a potentially attractive revenue source for Community Access Centres in their progress toward self-sustainability.

Major employers and the main providers of distance learning should be consulted, and perhaps form a roundtable with Government and other interested parties, to examine the financial and ICT architecture needed for the development of a robust model of life long learning.

National Innovation Council

For Trinidad & Tobago's National ICT strategy to be most successful it will need to be accompanied by a programme that looks to foster increased levels of innovation and entrepreneurship. If the country is to fully seize the opportunities offered by the global information society it will, consistently, need to make breakthroughs in science and technology, capture new markets with innovative products and be constantly developing world-class expertise and technical talent. A National Innovation Council, consisting of business leaders, academics, entrepreneurs and top government officials will be assembled and tasked with developing a

strategy to help stimulate and accelerate increased levels of innovation within the country. The Council will examine ways to create increased levels of knowledge and innovation at all levels of society, to encourage investment and improve quality of life. The Council will also explore new methods to attract, develop and retain the best and brightest people and improve business and regulatory policies to further support and encourage innovation.

Increasing Awareness, Promotion and Sensitisation

ICT Awareness Programme

All aspects of society will be included in a generic awareness campaign. This campaign will then be spun off and tailored to address specific interest groups. The generic awareness campaign will launch with a theme – a name with a visual image to support and encourage retention. The visual and programme title will be accompanied by a tagline or identifier which will provide a cursory explanation to assist in comprehension. This theme and logo (identity) must be created to speak to all segments of society. To be most effective, the identity must be simple, clean and concise.

Once the identity is established for the programme, a generic awareness campaign will be created. This multi media campaign will include television, radio, print, outdoor and new media (web) strategies. The campaign must reflect the voice of the people, from the people. It must avoid being positioned as an arbitrary government programme; it must be presented as a programme that will enhance and improve everyday life. It cannot be seen as threatening and must portray the future and it must be high energy, showing all aspects of life in T&T and representing all peoples.

As well as portraying the people of Trinidad and Tobago, the ICT Awareness Programme would benefit significantly if it was visibly supported by popular cultural icons such as highly respected names in sports, music and entertainment. The feasibility of this is to be closely examined.

The general direction that is established with the generic awareness campaign will then be spun-off to address specific marketing categories. The content will include a targeted explanation of the programme and how it can benefit the individual. It is important that the messaging ensures that readers can see themselves reaping direct benefits from the results of the country's connectivity agenda. It is also important that

these benefits are seen as tangible. More than simply increasing awareness, the programme must provide clear demonstration that increased ICT usage will provide access to a better lifestyle in terms of employment, wealth, health etc. – and that these benefits can be achieved in a reasonable and tangible time frame.

Specific projects within the ICT Awareness Programme would include:

Government Awareness Project
An awareness project utilising various media such as print and web will be created for circulation to all government personnel. The messaging will speak to the important role of government in terms of being the catalyst of T&T's National ICT initiative. It will also address the role and support required of government staff in ensuring that the ICT agenda is executed effectively. As with all the specific marketing categories, the messaging will clearly identify the benefits to the individual.

Educational Awareness Project
This campaign will be tailored to speak to all those in the education system. It will be broken into age specific categories including.

- Preschool
- Primary to middle school
- High School (teens)
- University and Colleges

A special campaign directed to facilitators, teachers and professors will be created to not only train the teachers, but also emphasising the importance of encouraging students to enthusiastically embrace ICT.

Enterprise Awareness Project
A business-to-business campaign will be created to notify small and medium enterprises of the opportunities that abound through the adoption of ICT. For the larger corporations, a Corporate Sponsorship Programme will be advertised.

Consumer Awareness Project
Although this awareness initiative will address all consumers, it will place specific focus on two specific segments of society - seniors and stay at home mothers. Both groups are great influencers and thus key to the success of the programme. Seniors will be informed that they too are included in the future of the country and vital to the success of the programme. Stay at home mothers will also be addressed as an important sector of the populace, particularly with respect to e-Commerce.

ICT Promotion Programme
A wide variety of materials will be required to create promotion of the various programmes and vocational opportunities. These will include:

Consumer Education
Consumer education will be divided into two tiers: the educators and the students. The ICT programme will create an increased requirement for technical support in all technology related fields. The current technical talent pool is inadequate to meet the needs of a successful national ICT campaign and many more technical support people will need to be trained and brought into the workforce. Facilitator's guides, videos, CD ROMs, teaching aids and work books will all be required to bring this sector up to speed. The students will in turn require similar elements and information materials to advance their involvement in the new initiative.

Community Access Centres will also be utilised on the same two tiers, for which the same educational materials will apply. A campaign to create awareness of the CACs will be required as part of a local area marketing plan. In remote or outlying areas where CACs do not exist, a mobile unit will be deployed. This mobile unit will be a customised recreational vehicle with audiovisual capabilities and generators to run the systems. A large screen will be set against the side of the vehicle with chairs set out for presentations, and computers will be available for hands-on access. Brochures and educational materials will be racked and flyers will be distributed in advance of the mobile unit's arrival, notifying the locals of its imminent arrival and generating enthusiasm, thus attendance.

Institutional Education
Again a two-tiered approach will be required. First we will need to teach the teachers; then we will need to provide the teachers with the appropriate materials to assist in the classroom. There will be various levels of learning materials available along with the various levels of marketing and awareness. Important in all marketing materials is the message of benefits. For example, the project must demonstrate to the preschoolers that computers are fun and demonstrate to the University and College sector that computers can ensure employment, high income and a stable career/future.

Corporate Programmes
Business to business opportunities and other profit driven benefits will be demonstrated to small and medium enterprises. The larger corporations,

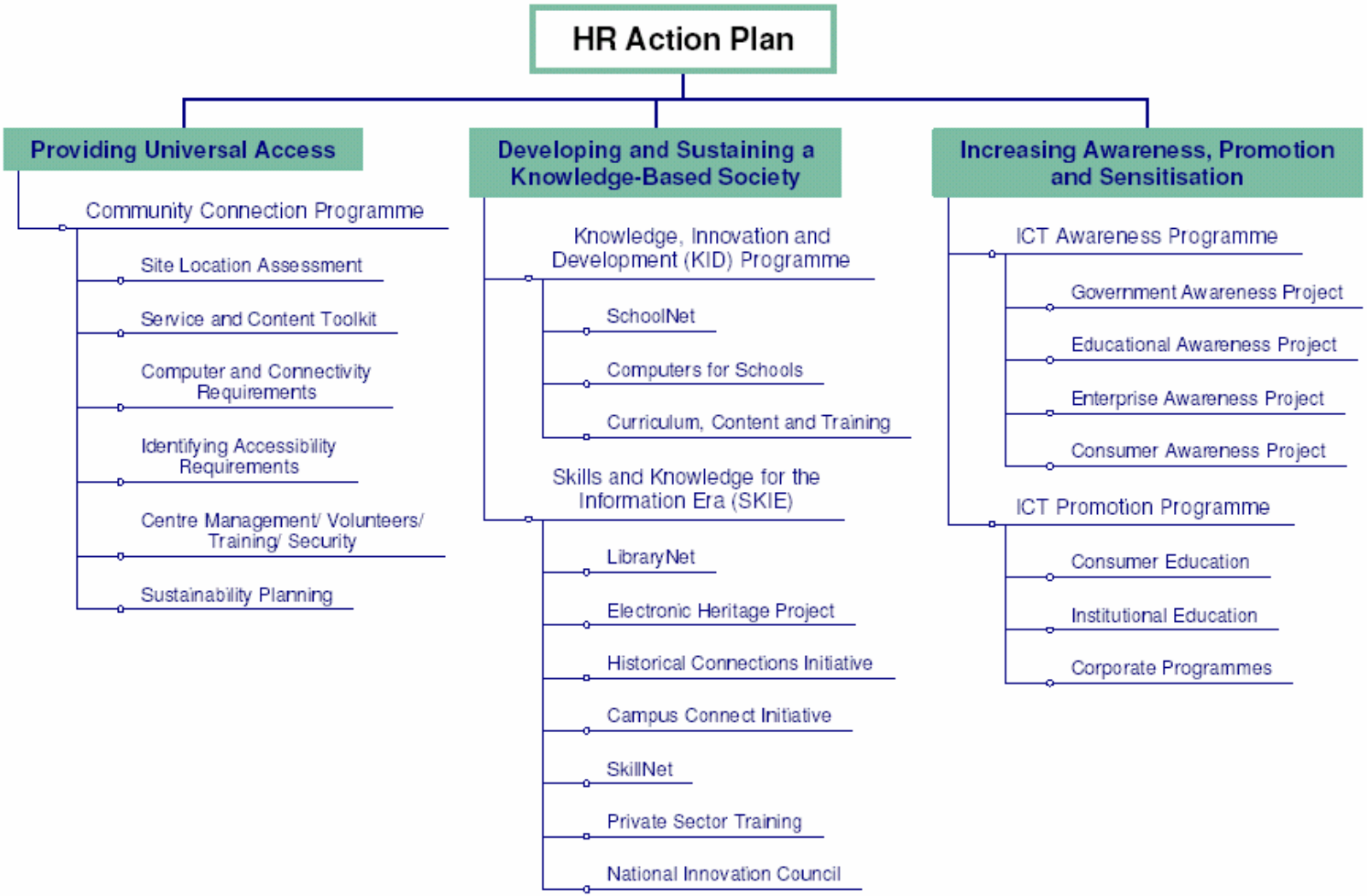
who are generally ahead of the technology curve, will be provided an opportunity to share in the exposure that all this messaging will create. Corporate sponsorship may be an effective strategy to:

- Assist in spreading the word; and
- Increase or defer the budget.

There are many ways in which Corporate Sponsorship can be utilized to create a win-win for the programme. For example, a banking institution may be interested in sponsoring the mobile unit or a local branch may be interested in providing sponsorship in the Community Access Centre. This is a very desirable programme for big business to be aligned with. Certain corporations may also be given the opportunity to conduct seminars and fly in key executives for speaking engagements and conduct media interviews. A full corporate sponsorship programme can be created for the ICT initiative.

A tradeshow booth will also be created to tour the country when the appropriate opportunity presents itself. This will include an educational kiosk, which will walk participants through all aspects of the ICT initiative. These electronic kiosks may also be placed in shopping malls, hotel lobbies, theatre lobbies and other places where the public comes together.

Appendix: Human Resources Action Plan "Key Strategies, Programmes and Projects



C3. Economy & Finance Action Plan

Contribution to the National ICT Plan

Implemented effectively, Trinidad & Tobago's ICT agenda has the potential to revolutionise the way that individuals, institutions, industries and government interact by broadening the reach and increasing the depth of communication. It can transform the buying and selling of goods and enrich the quality of information – which in turn creates additional corporate value.

With an enabling infrastructure built on easy access, low cost and open standards, start-up and small businesses will be able to compete in arenas that were traditionally only open to large players. New business models, such as on-line intermediaries will change the way entire industries function, enabling companies to compete internationally with a virtual, instead of a local, physical presence.
Trinidad & Tobago is well positioned to capitalise on the opportunities offered by the global information society. It is well situated to service both the North and South American markets, investment sources are available, Government is committed, current infrastructure build-out is adequate to meet short-term needs, and enabling legislation is being introduced. The general population is well educated and now sees careers in information technology more appealing than traditional professions such as law, medicine and accounting. There is a vibrant business environment with a large number of small and medium enterprises that could benefit significantly from increased levels of on-line trading. If the country moves aggressively, the Internet economy could provide tremendous opportunity for businesses working within T&T, and those local companies who trade beyond our borders.

This market expansion is by no means assured. As the e-Readiness and Benchmarking studies have indicated, Trinidad & Tobago lags badly in terms of business-to-consumer and business-to-business interactions. There are a few consumers on-line, but they are mainly browsing and not using the Internet as a convenient and reliable channel for buying goods

and products. Additionally government is in its early stages of electronic service delivery and not interacting with businesses on-line at this time.

Trinidad & Tobago must come to terms with there is no more "business as usual". Globalisation has been hastened by the Internet's powerful reach and distribution capabilities. Decades-old industries are facing massive change, and new economies are rapidly emerging. Traditional value chains are unravelling, and entire businesses being rebuilt from the ground up. In a relatively short period of time, all businesses will have to become e-businesses in some form if they are to survive in the digital economy.

All elements of society in Trinidad & Tobago stand to prosper from embracing ICT. T&T's e-business performance will have a growing impact on employment, sales, productivity, and investment throughout the economy. Jobs will be created in the technology field, but more will be created in areas such as sales, marketing, administration and manufacturing.

The aim of the Economy & Finance Action Plan is to identify the major programmes and projects that will assist in not only improving awareness of ICT in small business but also accelerating adoption, effective use and benefit realisation. For the Action Plan to achieve its ambitious goals it will need input, innovation and active participation from a wide range of stakeholders including government, TIDCO, NEDCO, SBDC, Chambers of Commerce, the Manufacturers Association, the Bankers Association, TSTT, the Telecommunications Authority and key academic institutions amongst others.

Desired Outcomes and Key Strategies

Desired Outcomes

At the outset of the project, the Economy & Finance Working Group identified a number of related outcomes that were felt to be important in determining the overall success of Trinidad & Tobago's national connectivity agenda. These included major outcomes such as:

- Development of the e-commerce (B2C), e-business (B2B) marketplace (domestic and international) – with a special focus on SMEs;

- Identification of T&T's "breakthrough" business opportunities through the intelligent application of ICT;
- Using ICT as a catalyst for business modernisation – including SCM, CRM etc;
- Increasing on-line interaction between industry and government;
- Development of an innovation agenda to accompany the ICT programme;
- Identifying the private sector's role in sustaining growth and development in the ICT programme;
- Identification of fiscal incentives including the role of venture capitalists; and
- Attracting, developing and retaining ICT talent – including the avoidance of the Brain Drain.

Key Strategies

During the course of the ICT planning session, the Economy & Finance Working Group refined its desired outcomes into three fundamental strategies. These strategies complement and build upon many of the themes put forward in Trinidad & Tobago's National e-Commerce Strategy 2004-2010:

1. Accelerating Transformation of the e-Marketplace
This Strategy examines some of the pre-requisites that are necessary to establish an enabling environment for the e-Marketplace. This is a relatively brief section of the Economy & Finance Action Plan as many of the fundamental requirements in support of increased levels of electronic interaction have been addressed by the other Working Groups.

2. Growing the e-Marketplace
This is the major component of the Action Plan, examining the various operational and tactical initiatives that will help grow and sustain e-Commerce and e-Business in Trinidad & Tobago. It also explores programmes to help develop the ICT sector, including the development of hub and cluster strategies, how ICT can help current industries and the important role Government has to play in increasing ICT take-up.

3. Expanding the e-Business Talent Pool
This strategy outlines some of the skill development programmes that will be needed in support of increased usage of ICT and the development of the e-Marketplace.

Major Programmes and Projects

Accelerating Transformation of the e-Marketplace

Increased Competition in the Telecommunications Sector

The Benchmarking and e-Readiness Assessments confirm that Trinidad & Tobago's ICT development is currently being constrained by the lack of competition in the local telecommunication industry. If the country's e-Economy is to flourish domestically and internationally, it will need access to reliable, secure, high-speed and affordable telecommunication infrastructure. This will be best achieved by opening up the telecommunications sector to competitive market forces. The Economy & Finance Team support the other Working Groups in recommending accelerated liberalisation of the telecommunications sector. Furthermore, it is recommended that government consult widely with industry when designing its liberalisation programme.

Promotion and Awareness

General Awareness

The Benchmarking and e-Readiness Assessments also confirm that there is only a small percentage (approximately 9%) of the general public regularly using the Internet, and as a result, only a very small percentage of local companies are using it as a business tool. An effective promotion and awareness campaign will be required if the country's connectivity agenda is to advance rapidly and more consumers and businesses are to embrace ICT. The Economy & Finance Team acknowledges the recommendations of the HR Working Group in this regard and suggests that special emphasis be focused on the needs and benefits of SMEs when designing the awareness campaign.

National Branding

An effective national branding effort that heightens Trinidad & Tobago's reputation as an innovative high-tech nation and a player in the global e-Marketplace will also go a long way in accelerating adoption of ICT in the local business community. It will assist in two ways. It will attract more international attention to T&T businesses from overseas markets and investors. And, it will provide local companies with increased confidence and incentive to move their businesses on-line. Some form of national icon may be a useful endorsement for this type of initiative.

Corporate Sponsorship

Attracting corporate sponsorship will assist the acceleration of the e-Marketplace in a number of ways. Sponsorship of Community Access Centres or e-Business training programmes will reduce the overall cost of the ICT agenda, increase overall ICT awareness for citizens and SMEs, demonstrate wide ownership of the ICT initiative within the country, and provide valuable exposure for the sponsor. The recommendations made by the HR Working Group in this area are strongly supported.

Fiscal Incentive Programme

A number of tax and other fiscal incentives have been identified as useful mechanisms for stimulating ICT take-up and ICT sector expansion. It is recommended that a thorough analysis of various fiscal incentives be carried out over the next twelve months. The Economy & Finance Working Group identified some potential incentives that are outlined below:

- Approved companies in the informatics sector should be entitled to a tax credit equal to 15% of the chargeable profits of such companies. Also, provision of or the development of Information Technology goods and services should be specifically included in section 16C of the Corporation Tax Act "Relief for Certain Companies" as an approved activity which, with applicable conditions for qualifications, would entitle such companies to obtain the tax credit. With the current tax rate of 30% such a credit would reduce the effective Corporate Tax rate to 15%.

- Given the high rate of obsolescence of computers, computer software and peripheries such as printers, products of this nature should be granted 100% wear and tear allowance in the year of purchase.

- The Technology Business Tax Certificate programme allows new or expanding technology businesses to turn their tax losses and credits into cash to grow their business. Approved businesses may sell their unused net operating loss carry forward to any corporate taxpayer for at least 75% of the value of the tax benefits. They can then use the money raised for working capital to buy equipment or facilities or for other business expenses. Such a tax credit certificate will be

issued on application by the Inland Revenue Division to technology businesses whose carry forward losses they have verified.

- IT services should be added to the list of services that qualify for Export Allowance under Part 4 of the Second Schedule of the Corporation Tax Act. Such services should also cover inter alia the development of computer software and the transmission of data pertaining to information technology. This would enable the information technology sector to avail itself of the benefits of export allowance on their export.

- Exemption of the Withholding Tax on royalties payable on transmission of information technology data.

- Providing foreign-based T&T nationals, who work in the ICT sector and are returning to the country, with Duty and VAT exemptions on all personal household effects.

- Another incentive programme could be competitive rates for office space in well-planned industrial parks equipped with modern telecommunications services.

Enabling Legislation

Appropriate legislation will be required to support increased levels of e-Commerce and e-Business. Currently, the lack of clear e-Marketplace rules constitutes a major barrier to the use and growth of e-Commerce. The findings of the Legal Working Group are acknowledged and supported in this area. In amending legislation, it is recommended that government consult widely with industry to establish its concerns and needs with regards to increased levels of electronic commerce.

Growing the e-Marketplace

The National ICT Strategy should provide Trinidad & Tobago with the necessary momentum to kick-start the e-Economy. The Economy & Finance Action Plan has identified a number of programmes and projects that will help grow and sustain a healthy electronic marketplace over the medium to long-term.

Developing the ICT Sector

Local Company Growth
The country's drive for increased levels of connectivity in schools, businesses, communities and government will result in significant growth opportunities for local suppliers of computers, software, Internet, installation and repair services, and training. Clear conditions for participation into the liberalised telecommunications sector will provide new entrants with both the confidence and tools to compete and prosper in this expanding market, also providing new business and employment potential.

There could well be thousands of new employment opportunities created, however technical and managerial skills must also be developed if the local ICT sector is to maximise its growth potential and flourish over the longer-term. Many of the necessary skills development requirements are identified under the strategy "Expanding the e-Business Talent Pool" found later in this Chapter, and in the Human Resources Working Group Action Plan.

Cluster Development Programme
A Cluster is a group of interconnected companies, educational and research institutes, and associations in any particular geographic location. Clusters develop as a result of linkages between the members and gain their importance from the synergies thus created. If Trinidad & Tobago takes an aggressive move in implementing its ICT agenda, there is thought to be a significant opportunity for the development of ICT-related Clusters in fields such as customer care centres, software development, application service providers, new media, data processing, computer assembly etc. Over the next twelve months, it is recommended that a study be commissioned to determine the opportunities, benefits and challenges that will be encountered in launching a major *Cluster Development Programme*.

ICT Anchor Company
It is recommended that the government and the private sector work together to explore the potential for attracting an "ICT Anchor Company" to the country. An "Anchor Company" is the term given to a major high-tech company such as a computer manufacturer, software developer or component assembly plant that is introduced to a community to help stimulate growth in the local ICT sector. The presence of these large high-tech companies helps attract the brightest IT talent, both technical and creative, and fosters training and development. Many of these Anchor Companies also result in the spin-off of numerous feeder companies by becoming major suppliers or buyers of goods and services. Costa Rica

recently attracted a large Intel plant and has reaped significant benefits as a result. A Feasibility Assessment to examine the requirements, benefits and challenges of attracting an ICT Anchor Company should be considered over the next twelve months.

ICT-Enabled Growth

Growing Traditional Industries
In addition to developing an ICT Sector within Trinidad & Tobago, the introduction of increased levels of connectivity and automation can be used to help grow current, more traditional businesses.

An e-Business Roundtable, comprising of leaders from government, industry and the technology sector will be assembled to provide vision and guidance in this area. The Roundtable will work with various Industry Associations to explore the potential for ICT being used as a catalyst for the further enhancement of foundation industries such as financial services, energy, ship building and repair, and port and fisheries management. There is potential for some of these larger industries to become "hubs" for electronic transactions across the Caribbean and Latin America. This should be closely examined as part of the Roundtable's mandate.

Smaller sectors, particularly areas such as tourism, medical training, culture (arts, music, crafts etc.) and exports in flowers, fruits and vegetables seem particularly suited for growth through ICT. The Roundtable will also work with representatives from these areas to examine how ICT can best be applied.

Business Modernization
Of course, business efficiencies and improved customer service levels will not be achieved solely by going on-line. It will also require management training, upgrades to and integration of back-office technologies, improvements to the supply-chain, enhanced manufacturing and production systems, and education on business process reengineering and other business improvement techniques. Advanced training packages that address these types of issues should be incorporated into the *SKIE Programme*. These courses should be practical, technical and targeted at senior ICT professionals and managers.

Experience from other jurisdictions has shown that increased levels of e-Commerce can place severe demands on distribution and logistical

systems. It is recommended that a study examining the current distribution and logistical infrastructure within Trinidad & Tobago, and its suitability for increased levels of e-Business be carried out in the next eighteen months. The Postal Service should be included in this study – perhaps as sponsor.

Student Connection Programme

The *Student Connection Programme* is an innovative initiative aimed at assisting SMEs ready themselves for e-Business and providing young adults with learning opportunities and early exposure to valuable work experience. *Student Connections* will place specially trained students from university or community colleges in small businesses or non-profit organisations to assist with the adoption of ICT. The companies will benefit from increased understanding and better use of ICT and the students, who will be paid for their services, will gain valuable job experience. The *Student Connections Programme* will be designed over the next twelve months.

Government to Business Interaction

Government has an important role to play in stimulating and accelerating the e-Economy, and will need to work closely with industry, especially SMEs, in designing programmes and services that prepare local companies for greater levels of electronic transactions. Government to business interaction can assist in a number of ways:

e-Government Portal

Government's introduction of a "client-centric Portal", that provides a one-stop-shop for all client information and services, is strongly supported by the Economy & Finance Working Group. A Gateway specifically tailored around the needs of T&T companies will help by making information and services easy to find – it should also provide access to practical tools and advice that will help SMEs move their businesses on-line.

It is recommended that the Business Gateway include interactive, practical information such as:

- *Business Start-Up* – Facilitation, market research, business planning, hiring employees, importing and exporting, etc.
- *Taxation* – Corporation tax, payroll deductions, excise taxes, VAT, etc.
- *Financing* – Government assistance, private sector financing, micro-credit, etc.

- *Regulations* – preferably tailored to specific industries or sectors
- *Human Resource Management* – HR planning, pay & benefits, labour laws, layoffs and terminations, health & safety
- *E-Business Training and Support* – information on Community Connection Programmes, local training centres, etc.

A wide variety of Government-to-Business service transactions should also be made available through the Business Gateway including:

- *Business Registration and Incorporation*
- *Business Name Search*
- *Tax remittances*
- *Import/Export/Customs Applications*
- *Land Use Building Permits*
- *Other business-related licenses and applications*

It is recommended that some form of "Business-to-Business-Connect" application be incorporated in the Business Gateway. This application would allow small buyers and suppliers to meet and interact on-line, helping generate new business and motivating SMEs to use ICT.

A help desk that provides support to small businesses, assists in starting up e-Businesses, and helps companies navigate their way around the Portal would also be helpful – especially in the early years.

e-Procurement

Government is the country's major buyer of goods and services. Many hundreds of companies sell to government every year. If government migrates its purchasing processes on-line it will likely result in the vast majority of suppliers also moving to the Internet – especially if this becomes the de facto manner in which government acquires goods and services in the future. It is recommended that government implement an e-Procurement solution in the mid-term – initially starting with an e-tendering module, which will not be so complex to implement. In addition to motivating suppliers to move on-line, e-Procurement should also offer operational efficiencies for government.

Consumer Protection

Most consumers are rightfully concerned about the privacy, security and accuracy of information transmitted over the Internet. It is recommended that a study of consumer protection issues, specific to

e-Commerce, be carried out over the next twelve months. In 2000, the OECD produced a document titled "Guidelines for Consumer Protection in the Context of Electronic Commerce" which will provide good reference in this area.

A *Consumer Gateway*, where all consumer-related information is centralized in a single site could also be a good candidate for inclusion in the e-Government portal and should also be considered.

Sustainability

ICT Industry Association

Technical infrastructure will only enable e-Business success to a certain degree. It is users, particularly business users who will employ the infrastructure to bring new money into their community that will make the e-Business network valuable and sustainable over the long-term. By encouraging widespread uptake and use of e-Business, and creating a united network of users, the joint benefits of the network will increase. This is the most direct way to improve Trinidad & Tobago's productivity and make the country more competitive in the global economy.

It is recommended that an ICT Industry Association be established to design an ICT Sector development framework, identify sector specific barriers, and develop standards and exchanges. The Association should examine how T&T's ICT sector can come together to create a powerful network to grow the industry, and advise other sectors on how ICT can be applied most effectively.

e-Business Roundtable

It is recommended that an *e-Business Roundtable* of top business people, technology experts and academics be assembled to serve as a "think-tank", to guide and challenge the Ministry of Public Administration and Information as it begins the implementation of the ICT agenda.

The Roundtable could also support the ICT Industry Association in its work in fields such as such as quality, standards, international marketing and strategic alliances.

The Roundtable should be further tasked with identifying tactics for reversing the Brain Drain into a Brain Gain.

Skills Development Programme

Building e-Business skills and a strong technical workforce is, and must remain, a critical element in making Trinidad & Tobago a more competitive country. Trinidad & Tobago needs to build its talent pool by the increasing the number of highly trained individuals within the workforce, and potentially by attracting skilled workers from outside the country. The Economy & Finance Working Group has identified a variety of initiatives that should be considered in this regard. Many of these initiatives may also have been addressed by the HR Working Group.

Community Connection and SKIE Programmes

Community Access Centres will provide a valuable, community-based location for the development of basic e-business skills. Specific focus should be placed on the e-Business needs of MSMEs. Access to electronic and hands-on training should be provided at the Centres. Subjects such as Computer Basics, Introduction to the Internet, Electronic Mail, Internet Applications, Business Tools on the Internet, and On-Line Transactions would be very beneficial.

Similar training packages should be developed as part of the *SKIE Programme* for delivery in training institutions outside of the CACs. However it is recommended that the *SKIE Programme* also incorporate more advanced training for technical personnel, CIOs and senior managers. A study to identify ICT training needs will have to be carried out as part of the design of the *SKIE Programme*. SMEs and ICT professionals must be actively involved in the design of this programme.

Computer Competency Certificate

It is recommended that Trinidad & Tobago adopt a programme to standardise basic computer skills and training and confirm the acquisition of recognised, up-to-date and relevant IT qualifications. It is further recommended that this programme be closely aligned to the EU International Computer Driving License, which has become internationally recognised and used in 88 countries and in more than 25 languages. The aims of such a programme include:

- Raising the general levels of competence in ICT in all sectors of society

- Enhancing mobility in business and improving productivity at work
- Enabling employers to make efficient investment in ICT
- Ensuring that best practice and quality issues are understood and implemented

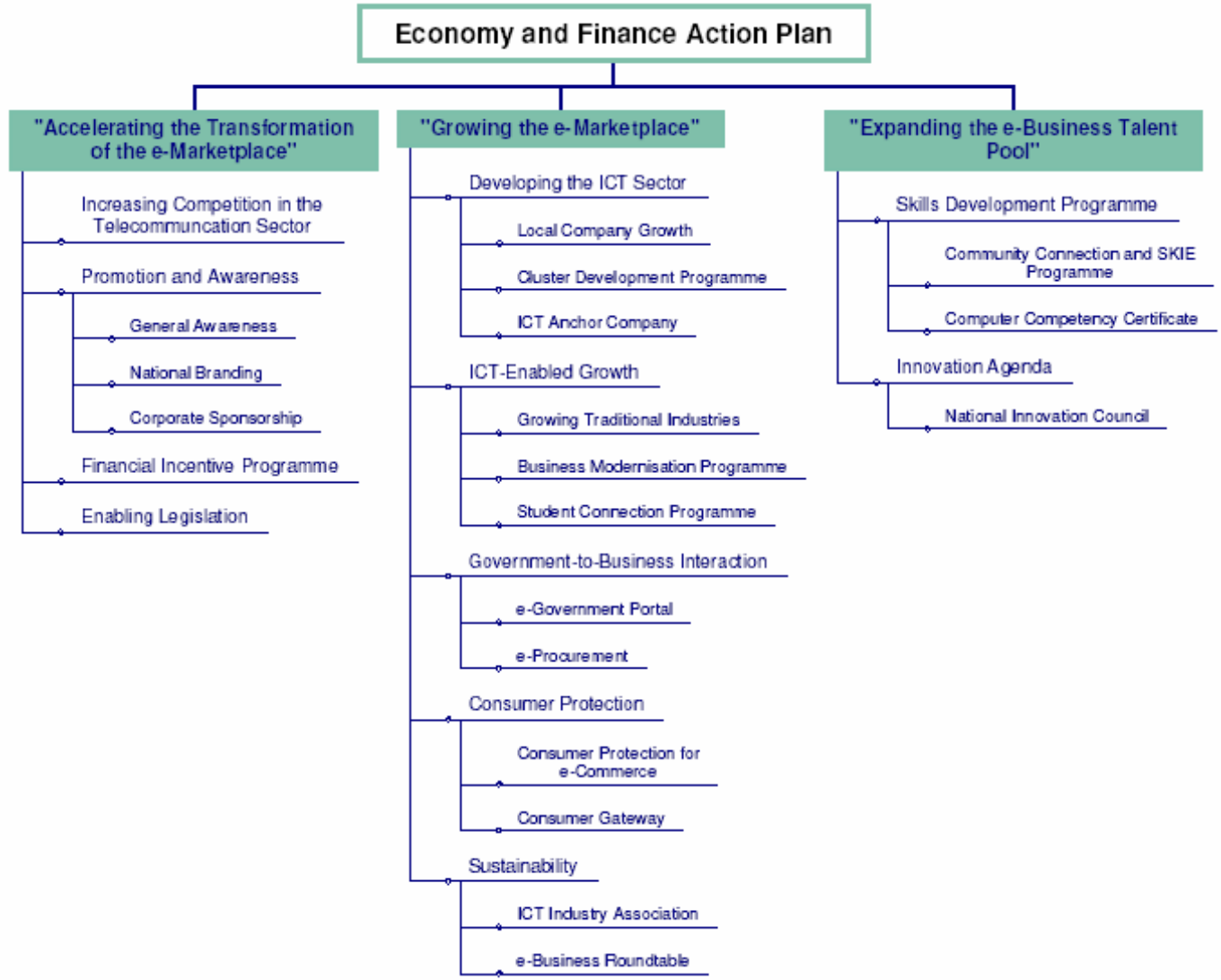
An analysis of the benefits of such a programme is to be undertaken within the next twelve months.

Innovation Agenda

National Innovation Council

The Economy & Finance Working Group endorses the introduction of a National Innovation Council in support of the country's campaign toward a knowledge-based society. The Council should explore an awards programme that acknowledges excellence and innovation in e-Business and e-Commerce for SMEs, an e-Entrepreneur programme and financial incentives for R&D and product innovation.

Appendix: Economy and Finance Action Plan "Key Strategies Programmes and Projects"



C4. GOVERNMENT ACTION PLAN

Contribution to the National ICT Plan

As the driving force behind the National ICT Plan, government has before it a great challenge – and a great opportunity. If Trinidad and Tobago is to become a knowledge-based society, government must take a lead role in promoting the adoption and benefits of ICT. The Government ICT Action Plan outlines how this is to be achieved.

Information and communication technology can help governments achieve dramatic improvements in the very things it was created to do – provide key services to citizens, businesses, organisations, and foreign entities. It has been shown that the effective use of technology can reduce the costs of government operations. However it can also be used to improve the quality of government services, in ways such as increased accessibility, responsiveness, transparency and accountability. In order to achieve these benefits, it is necessary to move beyond simple automation of functions, and concentrate on how ICT can be used to transform the broader public service.

Government touches all citizens' lives, in various ways at and at various times. By effectively adopting ICT, government can improve the quality, efficiency, and enjoyability of these interactions. In doing this, it can demonstrate to citizens and businesses alike that ICT is a tool that can help us do things better, whether it's getting a driver's license or starting a business, accessing health care or even voting.

Government has a responsibility to help improve its citizens' quality of life. As part of the National ICT Plan, the appropriate use of ICT in government can help Trinidad and Tobago deliver on this responsibility.

Desired Outcomes and Key Strategies

Desired Outcomes

Over the past several years, the Government of Trinidad and Tobago has been gradually incorporating ICT into its operations. Some benefits have already been achieved. However, as part of the National ICT planning process, the Government Working Group identified a number of additional outcomes that could be achieved as a result of this focused national initiative. Through facilitated discussions involving stakeholders from various areas of government, the following outcomes were selected as appropriate goals of the Government ICT Action Plan:

- All ministries, agencies and departments to be connected;
- All appropriate government services to be available electronically;
- All appropriate community-based services to be available electronically;
- A Government Portal and Intranet to be created;
- All necessary enabling legislation to be implemented;
- All necessary training and skills to be in place;
- Government service delivery standards to be improved;
- Government to be a "model user" of ICT, and a catalyst for ICT acceleration throughout society;
- Government to comprise a client-focused, technologically-knowledgeable culture; and
- ICT usage in government to be sustained through appropriate bodies, structure, and support.

These outcomes will be achieved through the implementation of five key strategies, described below.

Key Strategies

The desired outcomes of the e-Government development process can be achieved through the pursuit of five key strategies. These strategies, and their related programmes and projects, include the following:

- Electronic Service Delivery Strategy
- Public Sector Reform Strategy
- e-Government Awareness and Access Strategy
- e-Health Strategy
- e-Justice and National Security Strategy.

Electronic Service Delivery Strategy

In the digital age, governments must present their service offerings in ways that are simple and intuitive for citizens to use. The evolution of various electronic technologies has made this a very achievable goal. e-Government is about utilising information and communication technology in order to provide people with access to high-quality, citizen-centred services at the time and place of their choosing. Governments are being forced to consider what are the key things that citizens and businesses want to be able to do online. Information and services in immigration, licensing, health, education, and jobs feature prominently in most e-Government Programmes. However, e-Government is about more than putting up a series of uncoordinated Web pages. It requires proper strategy, management and governance. It requires careful thought and planning about the presentation and functionality of on-line services. And there must be suitably robust infrastructure and security to support these technologies.

This strategy addresses the range of programmes and projects, and the underlying infrastructure and support mechanisms, that will enable the delivery of electronic government information and services.

Government Portal Management Programme

The purpose of the Government Portal Management Programme is to coordinate the development and management of all electronic government services, both those that interface with the public, as well as those internal to the public sector. The Portal will utilise Internet and Intranet technology to provide a single point of contact for all those seeking information or services electronically. Subsequent generations of the Portal may deliver services via automated telephone technology and/or mobile computing devices ("m-government"). Management of the Portal will require the creation of an appropriate body with responsibility for planning policy, setting standards, and liaising with other government bodies to ensure that customers experience seamless electronic service.

The Government Portal Management Programme is pursuing the following objectives:

- To provide a single point of contact for all electronic government services regardless of the Ministry or government office responsible;
- To provide effective management, governance and accountability of electronic government service delivery;

- To provide mechanisms for making decisions concerning the direction and planning of e-government; and
- To provide effective reporting on the performance of the government portal.

A number of projects will need to be launched in support of the Government Portal Management Programme including:

Establishing Citizen-Centred Service Vision and Objectives
Utilising ICT to enable the creation of a citizen-service focused Government Portal requires a fundamental understanding of the principles and objectives of citizen-centred service. The "citizen-centric" service approach has been successfully applied in a growing number of jurisdictions worldwide. This approach supposes that service delivery should be based not on the organisational structures of government, but on the needs of people. In the past, this was an impossibility, as public sector organisations were constrained by the inability to rapidly process and distribute information. In the electronic age, governments have access to technologies and tools that allow organisational collaboration on an unprecedented scale. The application of these tools, in concert with redesigned operational processes and organisational relationships, is reshaping the way government works.

There have been many studies published that examine the concept of public sector service. (For examples, see "Good Practices in Citizen-Centred Service" by Blythe and Marson, Canadian Centre for Management Development 1999, and "Citizens First", CCMD 2003.) Government ICT project leaders must determine how the findings from these and other studies are to be applied in the development of the Portal, and define the guiding principles to be followed in the redesign of programmes and services. These principles shall be expressed as an overall vision for citizen-centred service in the public sector, which will be used to drive electronic service transformation efforts. They may also be a starting point in the design of citizen-centred services delivered via other channels, such as telephone and over-the-counter.

The vision and objectives identified in this project will be used as a reference point by other government projects, such as "Needs Assessment" below, that seek to define and respond to citizens' needs.

Needs Assessment ("Gillian's Story")
An integrated, efficient service approach begins with a reexamination of customers' needs, (where the term "customers" refers to anyone seeking

information or service from government). We know that government provides many highly essential services – how, when, and to whom are these delivered? It is useful to build a "customer lifecycle" profile for citizens, businesses, and international visitors. This approach allows for the identification, description, and categorisation of every interaction with government a fictional person (i.e. "Gillian") may have, from birth until death. As services are documented, opportunities to bundle complementary services will emerge, redundancies will be revealed, and new service delivery processes will be developed. The needs assessment exercise will also include a survey of how and when citizens would most prefer to access government services. When this information is combined with demographic data, profiles of different "communities" of citizens and businesses may emerge (e.g. seniors, students, rural residents, parents, small businesses, exporters, etc.). Later, when developing new service delivery channels, these customer and community needs assessment results will be useful in determining the mix of online, telephone, and over-the-counter services available to different groups of citizens in various areas.

Government Portal Development

The delivery of government information and services using ICT is the core functionality of e-Government. In the past, certain Ministries and government offices in Trinidad and Tobago have produced their own Websites, making selected information available to the public. However, these efforts have not been coordinated, which has resulted in inefficiencies and underutilised information resources. Citizens and businesses wishing to access government information are confused about what is available online, and where they can find it. No government-wide Web standards are enforced. Little information is shared between Ministries.

The Government Portal Development project represents a coordinated, integrated approach to making all appropriate government services accessible electronically. The project will begin with an assessment of citizens', businesses', and visitors' current service needs identified in "Gillian's Story". Then, before beginning the design, an informative exercise is to consider the features and functionalities of some of the more effective government portals in use in other jurisdictions. A "best practices" review of these Websites can be a useful learning exercise. Later, by incorporating elements of these sites' design into the T&T Government Portal, the design process can be fast-tracked.

The conceptual design phase of the project will identify the electronic information and services to be delivered via the portal, and the means by which they will be delivered. Coordination with the "Integrated Process Design" project will be essential, as this

project will identify how back-office processes and systems will generate, store and access information resources. Common look-and-feel design elements will start to be identified at this point also.

The Portal will present different functional areas to serve the needs of three main user types: citizens, businesses, and international visitors. A separate secure area of the Portal will be accessible by government employees. An initial list of potential information and services for each of these areas is described below.

The "Citizens" area of Trinidad and Tobago's Government Portal will include information and services such as:

- Information on jobs, benefits, health, education, and taxes;
- E-Services such as birth/death/marriage certificates, license and permit applications and renewals, e-payments (tickets, legal penalties, utilities, alimony, etc.), school registration, unemployment registration, and passport applications; and
- Contact information for various government services, and information on how to ensure service accountability, (e.g. centralised inquiries and complaints process, links to Freedom of Information and Ombudsperson's Office).

The "Business" area of Trinidad and Tobago's Government Portal will include information and services such as:

- Information about financing (incl. Micro-credit), business start-up, government programmes, joint ventures, and technical assistance;
- Regulatory information;
- Automated information services, e.g. When key legislation changes, or market conditions change;
- E-Customs information and services;
- Other e-services such as license applications and renewals, land and building taxes, e-payments (WASA and T&TEC), companies registry, Board of Inland Revenue Tax Calculation, Exporting assistance; and
- E-tendering and e-procurement.

The "International Visitors" area of Trinidad and Tobago's Government Portal will include information and services such as:

- Information on investment opportunities, citizenship, and tourism; and
- E-Services to be determined.

Information and services for government employees will also be accessible via secure areas of the Portal. These services may range from

employees' human resources information (e.g. benefits, attendance, grievances) to collaborative inter-departmental information sharing, to employment opportunities. As with the above areas, the array of information and services contained within the Portal must yet be determined.

Early iterations of the Portal will include simple, then increasingly complex information made available via a central government Website that utilises a standard design format (i.e. "common look and feel" for government entities). Later versions of the Portal will feature transactional services, and more sophisticated transactions. Additional Ministries and other government agencies may include their services in the Portal. Other service channels, such as those utilising mobile computing devices (m-government), may be explored. There is a need to plan the ongoing development of the Portal, in order to constantly meet constituents' e-Government service demands. The ongoing performance of the Portal must be monitored, including number and range of services, citizen satisfaction, cost savings, etc., in order to modify the functionality of the Portal.

Infrastructure Management Programme

In order for e-Government applications and processes to work most efficiently, appropriate technology infrastructure must be implemented and managed. The Infrastructure Management Programme will be responsible for providing a central, standardised approach to e-Government hardware, software, and network resources. It will take a lead role in implementing technical solutions of a shared nature, such as enterprise-wide software applications. It will also provide the supporting policy framework to enable such resources to be utilised by all appropriate government entities.

A ministry-by-ministry inventory of ICT resources has recently been completed, providing an accurate picture of government's current technological capabilities. Although e-Government planning is still in its early stages, it is clear even now that significant enhancements to the infrastructure will be required. It is imperative that the team responsible for government infrastructure management coordinate with the Integrated Process Design and Portal Development projects in order to gain an understanding of the future technology requirements.

Government technical architecture planning and design will be based on the requirements of various government stakeholders. At the heart of these requirements will be the ability for public sector bodies to communicate with others electronically. To this end, it is recommended that the Infrastructure Management Programme enable the seamless flow of information across the public sector through the creation of a Government

Interoperability Framework. The Framework will include policies and standards for connectivity, technical specifications, and operating instructions. It will ensure that technology platforms are compatible, and integrated. It will call for the deployment of standardised hardware and software based on open systems principles. It will describe standardised methods for the storage, retrieval and sharing of government data. And it will enhance information management capabilities through the use of common application frameworks.

The Infrastructure Management Programme will be responsible for the deployment and maintenance of the government Intranet. The Intranet will make use of the recently approved Government Backbone, which will provide Ministries with high-speed connectivity for the exchange of electronic data. It will assist with the deployment and management of shared systems for common administrative tasks, e.g. planning and budgeting, document management, payroll, HR, finance, etc. In short, it will be a programme responsive to the needs of the modern government organisation, providing technology that enables future processes of a "back office" and a "front office" nature.

Public Sector Reform Strategy

Information and communication technology represents an opportunity for government to do things differently than it has in the past. Introducing ICT in a pervasive way involves more than just technological change – it involves a re-thinking of the processes and organisational structures used to deliver public services. While much of the e-Government movement focuses on the customer-facing aspect of service delivery, this key strategy is concerned with the internal changes government needs to make in order to become a modern service-oriented organisation. Improved service quality, decreased costs, and increased responsiveness, transparency and accountability are some of the benefits associated with public sector reform. Thus the programmes described under this strategy focus on transforming the public sector, accompanied by the utilisation of ICT, in order to better serve its constituents.

Public Sector Transformation Programme

As part of the National ICT Plan, the Public Sector Transformation Programme will take a comprehensive and rigorous approach to modernising government operations. In this respect, the Programme will seek to accelerate efforts previously initiated in this area, providing increased coordination and resources.

Public Sector Transformation involves thinking about government services from the citizen's (or business') perspective. The programme will leverage the "citizen-centric" service findings identified in the "Citizen-centred Service Vision" and "Needs Assessment" projects described above.

A number of projects will need to be launched in support of the Public Sector Transformation Programme including:

Government-wide Integrated Process Design

As government organisations grow in size and sophistication, their operations tend to become increasingly fragmented. In various jurisdictions worldwide, this has led to inefficiencies, redundancies, and growing citizen frustration. "Dealing with government" has become a burden to people – unavoidable, but rarely enjoyable. The redesign of processes, focusing on opportunities to share information and resources within and across government departments, has the potential to reverse this trend.

Armed with an understanding of citizen needs and preferences (see "Gillian's Story"), it is possible to develop ideal processes for delivering services seamlessly, irrespective of government's internal organisational structures and current technology constraints. Focus should be placed on improving customer satisfaction, maximising efficiency, and eliminating redundancy. Operational, organisational and technological changes required to enable the future processes must be documented, and validated with affected stakeholders. Perceived costs, benefits and risks should also be identified, and used to evaluate the desirability of implementing various changes.

While organisational transformation requires much more than the introduction of new technology, technology can be a key enabler of integrated process design. With interdepartmental connectivity, (which is achievable with the implementation of the planned Communications Backbone), comes the opportunity to leverage shared systems of various types, which in turn leads to improved organisational performance.

Technologies that can assist with public sector transformation include:

- Common, government-wide desktop applications such as e-mail, scheduling, and word processing;
- Shared database systems, including a common data management platform;
- Government Intranet;
- Document (content) management system;

- Electronic workflow applications for automating, tasks, and for tracking work progress;
- Common financial management system;
- Customer relationship management (CRM) system;
- Unique customer identification system;
- other enterprise-wide systems (payroll, HR, e-procurement); and
- Decision support and knowledge management applications.

During all aspects of these projects, but particularly the design of new service delivery processes, channels and technology systems, it is imperative that these project teams work closely with the Government Portal Development and Infrastructure Management Programmes. These areas are interrelated; the former is responsible for delivering front-end e-Government services, the latter for providing the infrastructure on which e-Government systems will be based. Furthermore, government is currently embarked on certain enterprise-wide software implementations, such as financial management, debt management, and human resource information systems. These efforts must be coordinated with those of the larger Government ICT Plan. Public sector transformation will require the effective coordination of people, processes, and technology in order to be successful.

Public Sector ICT Skills Development

If government is committed to utilising ICT in a meaningful way it must build a citizen-centric and technologically knowledgeable workforce capable of exploiting its benefits. The administration and delivery of processes and services identified above in the "Integrated Process Design" project will require new roles, and new skills. Investment in skill development and acquisition will be a stated priority of government. This requires that staff have access to and training in appropriate technology tools and skills. It may also require a recruitment drive seeking to hire people already skilled in ICT. This project outlines how government can obtain the necessary ICT skills to enable the organisation to transform itself.

Working closely with the Integrated Process Design team will allow this project team to identify the roles and skills that will be required to deliver future processes and services, with emphasis on ICT and customer service skills. Minimal and optimal knowledge and skill requirements should be identified, along with corresponding training and skill acquisition strategies. ICT skills could include the following:

- Basic Internet and email usage;

- Enterprise applications usage, such as workflow, finance, payroll, HR, and knowledge management applications;
- Customer service training;
- Change management and psychological transformation; and
- Principles behind "the learning organisation".

In order to ensure there is appropriate leadership of ICT initiatives in government, it would be useful to implement a Government CIO training programme. The skills learned by participants in this programme, including ICT project management, user needs assessment and acceptance testing, and risk identification and management techniques, would be of great benefit in the many government areas undergoing transformation involving ICT.

In addition to initiatives geared at hiring trained personnel, an array of skill development approaches can be utilised to prepare employees to perform modern e-government functions. These training approaches may include:

- Computer-based training (CBT)
- Distance education – online learning and "virtual classrooms"
- Classroom learning
- Offsite training
- Peer-to-peer training
- Vendor-sponsored certification programmes

In order to track and manage performance, and ensure that staff are adapting and thriving in the new environment, consistent performance management appraisals are required. Such appraisals can be used to focus on both individual and group performance, and may include activities such as skills testing, performance reporting, and incentives linking compensation and recognition to performance.

For more on managing organisational and individual performance, see "Performance Management" below.

Government Service Centres and Call Centres

The administration and delivery of processes and services identified in "Integrated Process Design" will require new ways of delivering government services, not services specific to individual ministries. Integration and coordination is required in order to deliver these services efficiently, while improving customer service. Integrated processes and technology must be implemented

to allow services to be delivered centrally (i.e. not only from individual ministry offices). Just as the development of a Government Portal will enable the delivery of government services via the Internet, the formation of Government Service Centres and Call Centres will address service delivery over more familiar channels – over the counter, and over the phone. In order to provide a seamless experience for the customer, and minimise their challenges in receiving services (visiting multiple offices, understanding process to receive services, making multiple payments or applications, etc.) Government Service Centres will be set up to deliver all government services, including services to businesses, which will result in the GSCs also being "Small Business Service Centres". This will require that customer service staff (both counter and telephone) be trained to provide information and services in a number of different areas. Staff must be equipped with appropriate tools for easy look and retrieval of specific programme or service information. An up-to-date electronic directory of services and contact people will be required in order to allow the direct ("warm") transfer of a citizen to a service specialist, (e.g. case worker), in any area of government.

In order to enable this manner of centralised service delivery, "back-office" processes and technology will be shared by telephone, over-the-counter and electronic channels, thereby achieving efficiency savings and eliminating redundancies. To achieve this, this project must work collaboratively with multiple Government project teams, including "Integrated Process Design", "Government Portal Development", and "Infrastructure Management".

"Transparency in Government"

Through the application of e-Government approaches and technologies, government has the opportunity to provide much greater transparency and accountability in its dealings with the public. If public sector organisations are going to play a lead role in transforming Trinidad and Tobago into a knowledge society, citizen trust and confidence in the openness and efficiency of government is paramount.

This initiative will provide citizens with insight and information about the inner workings of government, thereby engendering a relationship that promotes and builds citizens' trust in the public sector by improving responsiveness and accountability.

The "Transparency in Government" project is pursuing the following objectives:

- To promote greater citizen participation in government
- To eliminate corrupt practices
- To provide citizens with information about government processes
- To improve government accountability
- To build and promote trust
- To attract international recognition, which may lead to increased foreign investment

As part of government's agenda to create a citizen-centred organisation, accountability mechanisms should be put in place to ensure that organisations and individuals are responsive to the needs of customers (both external and internal to government). For example, workflow systems can include "traceability" functions to determine who has accessed files, and when. There should be multiple methods and opportunities for customers to comment on service received, and processes to "close the loop" on contacts initiated. This will require the establishment of a reliable, efficient process for publishing information on government initiatives, programmes, and results. It will also require, perhaps in collaboration with the existing Ombudsperson's Office, the implementation of an independent, transparent process for addressing and responding to public inquiries and complaints of a significant nature.

Finally, increasing citizen participation in government is one of the long-term goals of the e-Government movement. Increased public participation can lead to better public policy-making, improved government responsiveness, and a strengthened and empowered society. ICT is a tool that can help citizens exercise their democratic rights. Technology can make it possible for people to easily access government information, follow the political process, discuss and comment on public policy, and provide feedback on public policy initiatives. As in the physical world, security in the electronic environment is of the utmost concern when it comes to sharing public and individual information. Many factors will influence the timing of introducing e-Democracy mechanisms. However, once citizens experience the potential of e-Democracy tools to improve the quality of their governance, they are likely to be embraced by the connected population.

Performance Management Programme

In government, as in all major organisations, what gets measured gets done. Government can demonstrate its commitment to service delivery improvement through the implementation of a robust performance management programme, measuring and tracking

results in a number of ways:

- Customer feedback from citizens, businesses and visitors;
- Citizen Surveys;
- Staff feedback;
- Performance management software; and
- Service performance monitoring and reporting.

The findings from performance management studies can be used to update and improve process, technology and organisational designs, potentially leading to benefits such as:

- Improvement in time taken to respond to service requests, queries and complaints;
- Cost reduction;
- Improved service quality or quantity;
- Increased inter-agency integration and information sharing;
- Improved employee satisfaction; and
- Improved government accountability.

e-Government Awareness and Access Strategy

e-Government has the potential to provide greater benefits the more it is used. For example, as more people move away from using outdated service channels in favour of more efficient electronic ones, government reaps benefits in cost savings and/or improved service quality. The more individuals that are able to access efficient, high quality services at anytime and anyplace, realising time savings, greater convenience, and improved customer service in the process, the greater society benefits. It is imperative that government promote public awareness of and access to e-Government services. All members of society interact with government at one point in their lives. For this reason, government has a unique opportunity to act as a catalyst for change, using their electronic services and programmes as an incentive for citizens and businesses to get on-line. This strategy addresses the means by which the public sector can increase public participation in the knowledge economy.

Public Awareness Programme

For its part of the National ICT Plan, government is determining how it can do things differently, not only for the tangible benefits this will produce, but also to enhance its image as a contemporary organisation. As government efficiency and responsiveness improves, its image as a slow-moving bureaucracy will be eroded, replaced by one of a modern, efficient and effective organisation. It is important that the government embark on a Public Awareness Programme, coordinated with the National ICT Awareness Programme, in order to ensure the public's perception of its capabilities matches the reality.

The Programme will have external and internal facing elements, each utilising various communications media. Internally, the Programme will inform public sector personnel of government's role as a catalyst in T&T's National ICT initiative. It will also address the role and support required of government staff in ensuring the ICT agenda is executed effectively. Externally, public awareness efforts will focus on government's emerging ability to service citizens more effectively through the use of information and communication technology. In addition to print, television and radio media, an "e-Government roadshow" presentation will be shown to groups in various parts of the country in order to share information, and respond to questions and feedback on government ICT planning efforts. As with all ICT marketing efforts, the messaging will clearly identify the benefits to the individual.

e-Health Strategy

Health care is one of the most important services that government provides to its constituents. In other jurisdictions around the world, governments are utilising ICT to provide higher quality health care for lower costs. Clearly this is an area that Trinidad and Tobago is interested in exploring further. At this point, ICT planning in the health care sector is in its infancy. While the electronic delivery of certain government services, such as submitting various forms and payments, has been discussed in some detail, e-Health services have not yet been described. Thus, it is recommended that the initial stage of the e-Health strategy focus on the development of an e-Health Feasibility Study.

e-Health Feasibility Study

There are a number of avenues that need to be explored in order to develop electronic health care services in a meaningful way. A feasibility study will examine four key areas of e-Health:

- Online health care services, such as online medical and health information sites, electronic diagnosis and treatment networks, and collaborative initiatives between health care providers;
- Supporting infrastructure, including physical, technical and legislative infrastructure, interoperability standards, and security parameters;
- Health care education initiatives, collaborating with the education sector to develop health care training initiatives using ICT; and
- Business opportunities in the health sector such as health record transcription services, e-health content development, and collaborative ventures with other CARICOM countries.

The development of the study will involve key stakeholders from the health care field, including physicians, nurses, Ministry staff, ICT professionals, and international health care experts. The purpose of the study will be to describe T&T's current health care environment, identify key opportunities and risks, and recommend actions for improving health care through the use of ICT.

e-Justice and National Security Strategy

In Trinidad and Tobago, the administration of justice and security is a dual role performed by the Ministry of the Attorney General and the Ministry of National Security respectively. While in the past the separation of these functions into two organisational units made sense for many reasons, in the electronic world it is important to determine how these entities can collaborate in order to better protect the public. In many jurisdictions, the development of an "e-Justice" system, in which critical information is made available to authorized officials throughout the country, has been an effective way to improve the administration of justice, and enhance public safety. As part of the National ICT Plan, it is time for Trinidad and Tobago to consider the feasibility of embarking on an e-Justice and National Security Strategy.

e-Justice Feasibility Study

As with e-Health, the application of ICT to the area of public security is a subject of enormous scope. There are innumerable ways in which technology may be applied in order to prevent crime, improve the administration of justice, increase the effectiveness of law enforcement agencies, and better inform the public of threats to their safety. Additionally, with the widespread use of ICT comes the threat of new types of crimes, including computer "hacking", identify theft, and software piracy. A future e-Justice Programme must oversee the management of several projects that focus on the deterrence, prevention, and prosecution of crimes, and the overall enhancement of public safety through the use of ICT. At this early stage in the development of e-Justice it is important to consider what is possible in T&T, given the current environment.

There are a number of avenues that need to be explored in order to develop a national e-Justice Programme. It is recommended that a feasibility study be conducted, identifying opportunities and challenges in several key areas, described below.

CyberLaws and CyberCrime

While the use of ICT has the potential to improve the quality of life in Trinidad and Tobago, it also opens new avenues for illicit activities. Computer "hacking", identity theft, software piracy, denial-of-service attacks, and corporate espionage are all examples of crimes made possible, or made simpler, by the adoption of ICT by citizens and businesses. In response to this threat, the creation of new laws, and new organisations for enforcing these laws, is appropriate. It is necessary to review existing legislation in order to understand its weaknesses in light of new potential threats. Additionally, the ability of domestic law enforcement agencies to detect and prevent these crimes must be evaluated. Based on these assessments, recommendations will be presented for the formation of new legislation and new law enforcement agencies to fight the emergence of cyber crime.

Integrated Justice Network

A feasibility study will examine the potential for integrating the information systems of the various National Security and Attorney General organisations in order to allow the more timely and efficient sharing of knowledge that leads to the detection and prevention of crime. The study will also examine how other Ministries and agencies could be tied into the Integrated Justice Network as needed, including the Revenue Authority, Customs, Board of Inland Revenue and the Licensing Division.

If considered feasible, the Network would allow information on offenders, crimes, and proceedings to be accessed, (by authorised persons), at any point in the country at any time. It would also enable law enforcement agencies to identify patterns of criminal activities that presently go undetected.

This capability would allow a host of Integrated Justice Network (IJN) applications to be developed, including:

- Tax evasion detection and revenue recovery;
- Neighbourhood intrusion detection and Rapid Response;
- Cyber crime detection and prevention;
- Customs Information System;
- License information system (e.g. vehicle registration);
- Immigration system, including deportee database;
- Intelligence network, linked to foreign databases;
- "Dangerous offender" registry; and
- "Family crimes" registry.

Where appropriate, information produced by the IJN could be communicated to the public via the Public Safety Information Network (PSIN), described below.

Public Safety Information Network

Lastly, the e-Justice Feasibility Study will examine the potential for media channels to be utilised for the rapid dissemination of information related to threats to public safety. The identification of threats due to crime and terrorism could originate from the Integrated Justice Network. Other threats– environmental, health-related, etc. – could be identified by appropriate ministries and agencies, and relayed to PSIN using ICT channels.

The development of the e-Justice Feasibility Study will involve key stakeholders from the both the justice and national security areas, including judges, lawyers, court officials, police officers, defence force members, ICT professionals, and international experts. The purpose of the study will be to describe T&T's current environment, identify key opportunities and risks, and recommend actions for improving public safety and the administration and enforcement of justice through the use of ICT.

Appendix: Government Action Plan "Key Strategies, Programmes and Projects"

C5. Legal & Policy Action Plan

Contribution to the National ICT Plan

Successful adoption and diffusion of any national connectivity agenda is significantly dependent upon a stable and clear regulatory and legal infrastructure that promotes, rather than hinders, the deployment of ICT. The framework must not only provide the "rules of the game" for investors in, and developers of ICT capacity, but it also must deal with the effects and outcomes of being a "connected society" that is actively participating in the global information-based economy.

The aim of the Legal Working Group ICT Action Plan is to identify the major laws, regulations and governing structures that will need to be reviewed, amended and enacted to address topics including but not limited to data protection, privacy, security and authentication, computer misuse, e-Commerce and e-Governance, taxes, custom duties, intellectual property, regulation of the telecommunications sector and Internet issues.

It is important to recognise that some work has already been undertaken in developing a policy and legal framework for the development of the telecommunications sector and to address the new issues and challenges that have been introduced by e-Commerce in Trinidad and Tobago. The following statutes have been enacted:

- The Telecommunications Act 2001
- The Computer Misuse Act 2000
- The Electronic Transfer of Funds (Crime) Act 2000
- The Copyright Act 1997
- Trademarks Act of 1994

Other pieces of legislation which are expected to be taken to Parliament for its consideration are:

- The Electronic Transactions Bill 2002 which seeks to give legal recognition to electronic documents and signatures and will deal with issues of validity of electronic contracts and liability of Intermediaries such as ISPs
- The Data Protection Bill which will provide protection to individuals with respect to their right to the privacy of their personal information
- The Trademarks Amendment Bill 2003
- The Copyright Amendment Bill 2000

As an enabler of ICT adoption, the Legal ICT Action Plan touches on a large number of areas and involves a wide variety of stakeholder groups. The programmes and projects identified within the Plan will only be implemented effectively if there is close coordination and cooperation amongst the various partners. Ongoing liaison with the Ministry of the Attorney General, Ministry of Legal Affairs, Ministry of Finance, TSTT, the Association of Independent Internet Service Providers (AIISP), the Chambers of Commerce and a number of other organisations is critical to this process.

Desired Outcomes and Key Strategies

Desired Outcomes

At the outset of the project, the Legal Working Group identified a number of outcomes that are critical in determining the overall success of Trinidad and Tobago's connectivity agenda. It also recognised that legislation is a key enabler in providing an appropriate environment for the achievement of these outcomes:

These included major outcomes such as:

- Easy and affordable access to ICT Infrastructure
- Accelerated take-up and growth of e-Commerce
- Enhanced credibility and attractiveness of Trinidad and Tobago to investors with the creation of a stable, innovative and technologically superior e-Commerce environment
- Adequate protection for consumers in the electronic marketplace

- An effective and efficient judicial and legal community that is knowledgeable about ICT issues and equipped with appropriate training in ICT-related skills and is afforded easy access to electronic legal research libraries
- More efficient and effective government processes that provide greater transparency, opportunities for citizen participation in policy making and increased access to government information

Key Strategies

During the course of the ICT planning session, the Legal Working Group refined its desired outcomes into four overarching strategies:

1. Developing a Legislative Framework and Appropriate Policies to Support a Robust ICT Infrastructure

The Telecommunications sector is the foundation of Trinidad and Tobago's robust ICT Infrastructure. The *Telecommunications Act 2001* establishes the basic legal structure for liberalisation of the telecommunications industry. The implementation of the statute requires the development of a regulatory framework for overseeing the transition to an open competitive telecommunications environment. Many jurisdictions have found that transition to a liberalised market has required a sophisticated, effective, credible and imaginative regulator. The implementation of the *Telecommunications Act* will be a critical step towards enhancing ICT infrastructure. Among matters that will be dealt with in this element of the Action Plan are, the prevention of anti-competitive practices, such as inappropriate cross-subsidisation, and rules of service governing carriers, as well as rules for access to the basic network by competing carriers.

2. Enabling e-Commerce and e-Government

To fully enable e-Commerce and e-Government, a legal infrastructure is as important as the physical infrastructure. In addition to a basic regulatory structure governing telecommunications and market liberalisation, a number of legal areas will require review and amendment. In some instances new legislation will need to be enacted where no law exists. For, example, proposed competition legislation will need to be reviewed and enacted to reflect the needs of a liberalised environment where new investors will be competing with an entrenched monopoly (in which government has a significant shareholding) that has the competitive advantage, thereby discouraging investment in this sector.

It is necessary to legislate for electronic commerce so as to remove obstacles to the legal validity of electronic contracts and to achieve legal certainty in the electronic environment. The lack of clear rules constitute a major barrier to the use and growth of e-commerce because the traditional rules which govern the relationships between parties to business transactions and which have evolved over time were created for a paper-based world. As new forms of business practices evolve, the traditional rules have become less clear in their application to an electronic environment.

The aim of the legislation will be to ensure equal treatment to paper and electronic transactions by clarifying how existing rules apply and updating them where necessary in a consistent and predictable manner. The Electronic Transactions Bill 2002 represents an important step in that direction. Its main provisions seek to grant legal validity to electronic transactions and signatures and to allow for their admissibility as evidence in a Court of law. Priority should be given to finalising this piece of draft legislation and enacting it into law.

Appropriate amendments to the existing Intellectual Property legislation (Copyright) need to be made to ensure the appropriate and unambiguous protection of electronic documents and electronic versions of already protected physical documents.

Issues of cyber squatting and other infringements of the rights of trademark owners on the Internet must also be addressed and the existing rules governing the use of trademarks and brands need to be amended.

With the Internet assuming increased importance as a commercial tool, greater attention needs to be paid to developing a policy to address Internet governance and domain name issues that is in keeping with international developments in this area.

Security of the Internet and the protection of individuals' rights to the privacy of their personal information are key measures for building users' trust in e-commerce and the new legislation must address these important areas.

The use of encryption technologies and certification authorities can provide the security that is required for electronic transactions by ensuring the integrity and confidentiality of messages that are exchanged. They can also provide the important element of repudiation,

which prevents any party to a transaction from denying his participation in the transaction.

The electronic environment also raises new issues for labour and existing legislation will require updating to deal with the new challenges.

3. Citizen/User Protection

There are concerns about a rapid transformation to a borderless information society that disregards national boundaries and which provides capacities for data collection retrieval, compilation, comparison, and creation of new data to a degree never known or even dreamed of only a few years ago. These concerns have some foundation.

It is usually the role of government in a "wired" society to ensure that appropriate safeguards, even prohibitions, are in place to provide protection from these risks. This is not to say, necessarily, that all protections of citizens and users can be accomplished solely through government regulation. The approach to consumer protection will be based on the strengthening of the consumer protection framework through legislative measures, encouraging self-regulation within the more structured sectors and through consumer awareness. The government will undoubtedly play a lead role along with industry, citizens and users themselves.

4. Appropriate Skills and Training for the Judicial/Legal Community

Achievement of the objectives set out above will, of necessity, require the development of a complex and multi-faceted legislative framework. This framework can only be as effective as the persons charged with the responsibility of giving life to it. Law enforcement is therefore an important component of the Legal Action Plan and in this regard, the enforcement authorities as well as the legal and judicial community have a significant role to play. Without the necessary training and development of Law Enforcement Personnel and legal and judicial officers in the new technology, the framework that is created will be ineffective and of little practical value.

Developing Appropriate Policies and Legislative Framework to Support a Robust ICT Infrastructure

Legislative Review

Having a solid legislative base to support ICT development within Trinidad & Tobago is as important as having the appropriate technology in place. A Legislative Review will be launched to examine the suitability of the current legislation for supporting new levels of ICT infrastructure.

The Review will examine a number of areas, including:

The Electronic Transactions Bill and related e-Legislation
A review of a number of current laws will need to be carried out to determine their appropriateness for use in an electronic environment.

Full implementation of e-Government and e-Commerce will require amendments to a number of pieces of legislation dealing with commerce and international trade, rules of evidence, recognition of electronic contracts, Rules of Court dealing with filing and service of court documents and the general streamlining of legal processes.

The Electronic Transactions Bill must be reviewed to ensure compliance with the legal principles that have been developed and adopted internationally by countries, which have enacted e-Commerce legislation. They include but are not limited to:

- Media neutrality (the creation of a medium neutral environment that does not discriminate between paper and non-paper transactions)
- Notarisation
- Use of electronic agents
- Liability of electronic intermediaries
- Technology neutrality

The Telecommunications Act 2001
Due to the passage of time and a greater appreciation for the complexities of the telecommunications sector, it is felt that a review of the 2001 Telecommunications Act be undertaken, and if necessary amendments, be effected, prior to full proclamation. This review of

existing legislation and related policies and guidelines will ensure that the *Act* is up to date, and relevant prior to proclamation. At the same time, Regulations should be developed that will provide for the establishment of performance standards and for mechanisms to be put in place for mandatory review of new legislation and the new regulatory structure at the end of an appropriate time period.

Competition Legislation to Promote Increased Levels of Competition in the Telecommunications Sector

The key to the development of the Telecommunications and ICT sectors is the creation of a well-regulated competitive environment. Under this new regime, citizens will benefit from a system of universal access to telecommunications services with greater affordability and accessibility of ICT. This in turn will promote an increase in e-Commerce activities and the use of government services on-line, encourage new public sector procurement policies and the development of a dynamic platform for the introduction of new technologies. Critical to the achievement of this goal is the conduct of a comprehensive review of existing laws regulating the telecommunications sector to identify any barriers that may hinder competition. This will be followed by the development of an appropriate legal framework to regulate anti-competitive practices and to provide for interconnection, universal access and service, fair pricing policies and quality standards of service.

Full Implementation of the Telecommunications Authority

The Trinidad and Tobago Telecommunications Authority (TTTEL) established by the *Telecommunications Act 2001* is in the process of preparing itself for full implementation of the *Act* when it is proclaimed. The staffing process for this agency has already begun.

Under the Act, TTTEL will be responsible for making recommendations to the responsible Minister regarding the granting of concessions and licenses. It will also be responsible for monitoring and ensuring compliance with conditions set out in the concession agreements or licences. The Authority will need to establish universal service standards (including access for persons with disabilities) and set the terms and conditions of access to the infrastructure network.

TTTEL will most probably need to work with TSTT and other providers to establish costing methodologies and develop terms and conditions (including access charges) for connection to the existing infrastructure network. Experience in other jurisdictions has shown that implementation of competitive services places new and challenging demands on regulators. Potential abuse of the incumbent's dominant position

and the creation of access "bottlenecks" must be avoided. Regulation must play a more important role than before in ensuring choice and innovation thrive.

Enabling e-Commerce and e-Government

The Creation of Policy and Legislation to Enable e-Commerce and e-Government

e-Commerce and e-Government must be developed to provide viable options for conducting business in Trinidad and Tobago if the National ICT Strategy is to achieve its ambitious goals. It is imperative that the Government adopts appropriate policies and enacts the supporting legislation that will facilitate the use of ICT as a tool for accessing government services and for conducting business online.

Legislative Review and Amendment

A key strategy in promoting effective participation in the digital environment is the building of trust by ensuring secure transactions, protecting the privacy of users' personal information, providing adequate safeguards for the protection of the interests of consumers and the rights of owners of intellectual property.

The creation of a predictable legal environment is also important for promoting effective participation in the e-marketplace since the traditional rules that governed the conduct of business are less than clear in their application to the new environment.

The increase in electronic access to information held by the Government will also create a need for the Government to develop the capability to deal with increased numbers of requests for information. A number of governments have in place fairly sophisticated access regimes that provide useful models of best practices that may be adopted by Trinidad and Tobago in developing policy in this area. . The basic principle is that the public has the right of access to information, subject to certain exceptions. Personal information is protected, but available to those to whom it relates. Commercial information and trade secrets are also protected. Most information about a government's activities is already accessible, subject to narrow exemptions for security, law enforcement and deliberations of Cabinet. There is generally a role for an independent decision-maker to enforce the application of the access and privacy legislation.

Amendments to update legislation in areas such as commercial transactions, misleading advertising and in other fields will also be required.

The Legal Working Group has identified a number of critical areas where new legislation is required. They include:

- Dispute Resolution
- ISP Liability
- Ownership of Information
- Electronic documents and signatures – including regulatory filings
- Validity of electronic contracts
- Privacy and data protection
- Intellectual Property and Copyright Protection
- Internet content such as misleading advertisement and defamatory material
- Ownership of information transmitted electronically
- The legal issues arising from the digitisation of government registry records such as:
  - Land Registry
  - Companies Registry
  - Births and Deaths Registry
  - Licensing Department
  - Customs and Excise Department
  - Inland Revenue Department
  - Immigration Department
- Labour and Employment Legislation

The creation of a legal framework to provide for the recognition of electronic transactions, security and authentication, and the issue of privacy must be addressed as a matter of priority.

e-Governance Analysis

Although Trinidad & Tobago's e-Government agenda is in its early stages, it may be an opportune time to examine the legal aspects of increased levels of government transparency, public reporting, e-Governance and e-Democracy.

Internet Governance and Domain Names

The Domain Name System (DNS) has many public policy implications and the worldview tends towards recognition of the country code Top Level Domain (ccTLD) as a valuable national asset. ICANN as the body responsible for the technical coordination of the global Internet system, has

taken the official position that the ccTLD is a public resource and on that basis has introduced a set of principles for the development of best practices for the delegation and administration of country codes within the global DNS.

A number of countries have been taking steps to regularize their system of administration of their ccTLDs. Some have introduced legislation to deal with the abuse of the Domain Name System through cyber squatting and other abusive practices. It is also widely recognised that the DNS also provides valuable portals for promoting the country's goods and services on the Internet through use of its country code as a brand name.

It is important that we develop a National Policy for the management of the .tt country code Top Level Domain that reflects developments which are taking place internationally.

Citizen and User Protection

Citizen and User Protection

The purpose behind a rigorous legislative framework for the protection of consumers is many-fold:

- Building of confidence by consumers
- Security of e-transactions
- Privacy of personal information
- Protection against harmful and defamatory Internet content
- Inexpensive redress
- Full disclosure in on-line transactions
- To ensure effective enforcement of the laws

Code of Practice for Consumer Protection in Electronic Commerce

Self-regulation will be an important component of the regulatory framework and merchants will be encouraged to adopt this approach to supplement Government legislative controls.

A Code of Practice for Consumer Protection in Electronic Commerce will be developed to establish benchmarks for good business practices for merchants conducting on-line business transactions with consumers. The Code will be developed by using the Organisation for Economic Cooperation and Development's (OECD's) guidelines for consumer protection in the context of electronic commerce.

Consumer Gateway
A Consumer Gateway will be developed as part of the overall e-Government Portal. The Gateway will allow consumers to quickly and confidently search for consumer information and services on the Web. Users will find everything from lists of product and food recalls and alerts on the latest consumer scams and frauds, to a wide array of interactive financial calculators that can help decide which bank or credit card is most appropriate or whether consumers should buy or lease their next vehicle. Additionally, it will offer valuable tips on how to protect oneself in various consumer situations such as shopping on-line, investing, dealing with telemarketers or door-to-door sales people, renovation contractors, car repairs etc.

Privacy and Confidentiality
The strategy to enhance citizen and user protection will also examine the important items of privacy and confidentiality. This includes such matters as protection of personal privacy for citizens regarding information held in databanks by both the public and private sectors.

The strategy will also deal with such matters as limitations on collection and use of data for anything other than its original purpose; and limitations on the use of data without permission from the person who supplied the data. In addition to protection of personal data, firms will want to be assured that any commercially sensitive information placed in the hands of government or in other databanks will be protected to avoid economic damage. Privacy legislation should also make provision for a number of these issues including unsolicited e-mail.

Intellectual Property Protection Policy
Trinidad & Tobago's acceleration into the information-society will result in a vast increase in the amount of digital information that is created, transmitted, shared and stored. All information, including concepts (whether in physical or electronic form) has an owner – the person who originally created that information. Copyright and Intellectual Property protection are important aspects in ensuring the integrity of original content and the rights of the owner of that content. This is particularly relevant for those people and organisations whose livelihood depends on the creation and sale of information, concepts and designs. Increased levels of electronic commerce and the exchange of digital information provide very real challenges with respect to protection of intellectual property and original content. A policy paper will be developed that examines the issues and appropriate actions required to provide high levels of Copyright and

Intellectual Property protection for all forms of electronic information, data and designs.

Protection from Inappropriate Content on the Internet
Broader access to the Internet and e-Commerce can raise issues regarding inappropriate electronic material. This includes pornography, websites and messages intended to foster hate or racism, and various scams that thrive in an atmosphere unrestricted by national borders and effective national law. With respect to pornography and hate messages, a balance between freedom of speech and protection from unwanted (or illegal) messages has to be sought. International cooperation may be required to deal with many of these issues, including such matters as child pornography.

Unique Identification
Another issue that will need to be examined is the development and use of unique identifiers that facilitate secure communication and authentication across the Internet. Although these protocols should promote increased confidence in e-Commerce and provide enhanced levels of consumer protection from potential fraud and disclosure of private matters, they could also raise a number of concerns with regards to privacy and personal identification. Unique identifiers often give the perception of "big brother", profiling, loss of personal identity and other civil rights matters. A study into the potential impacts of unique identification, the benefits and the concerns, will be carried out.

Appropriate Skills and Training for the Judicial/Legal Community

Technical Training

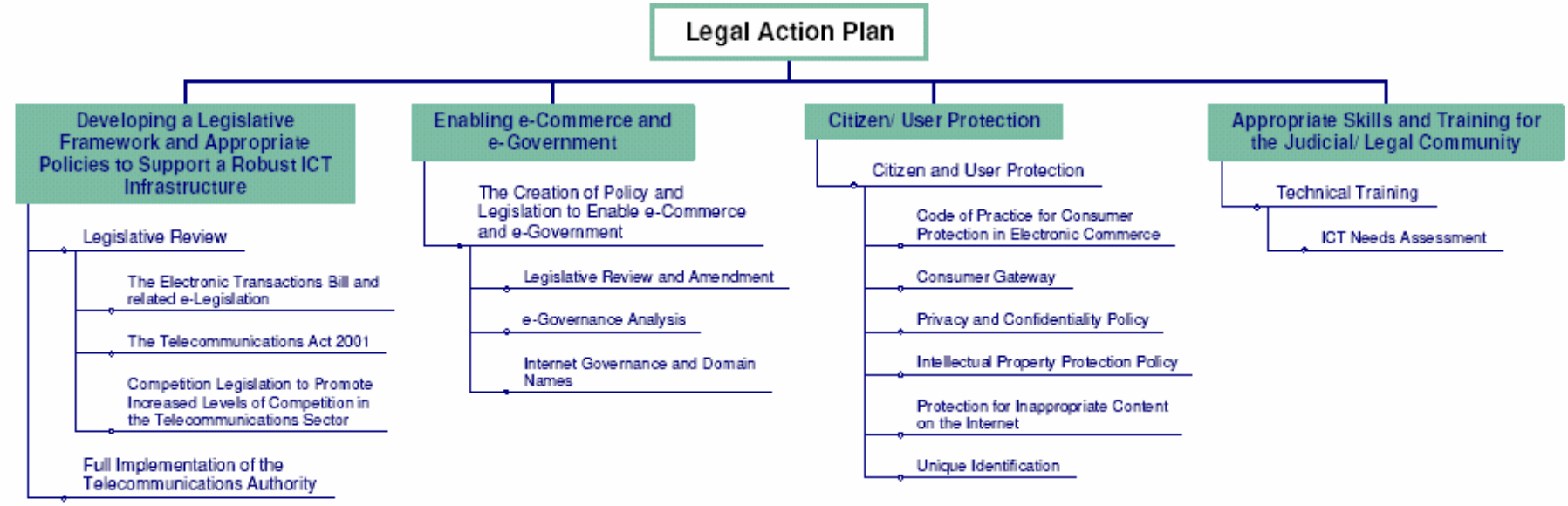
For centuries, the judicial and legal community has performed its role in a predominantly paper-based environment. Although there has been an

increase in levels of automation and electronic aids introduced into the system in recent years, the legal community still has some considerable distance to cover before it can be considered fully ready to participate in the digital society. Furthermore, judicial and legal officers will need to be provided with training programmes to increase awareness, understanding and effectiveness of legislation and processes that are peculiar to an electronic environment.

ICT Needs Assessment

As a preliminary step, a Needs Assessment will be carried out to examine the current level of ICT availability and usage within the legal community. The assessment will examine other jurisdictions that have introduced ICT into the justice system and have successfully introduced new laws to deal with enhanced levels of connectivity. The study will provide analysis and recommendations on the levels of ICT, the ability of judicial and legal officers to work more closely with ICT in the future and the level of training and awareness that will be required to prepare the community for effective application of new laws relating to the information-society.

Appendix: Legal and Policy Action Plan "Key Strategies, Programmes and Projects"



Appendix D

NICT Programmes and Projects Summary

Appendix D1:

National ICT Plan: Programmes, Costs and Timing

#	National Programmes and Projects	Estimated Programme Cost (US$)	Milestone Objectives	Target Dates	Implementation Schedule 2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008
1	***ICT Governance***	***$10M***	"Transition Team in place with responsibility for ICT foundation projects"	2004				
	NICT Governance Structure							
	National Innovation Council			2005				
			"National ICT Governance Structure in place with responsibility for achievement of all ICT goals"					
2	***Promotion and Awareness***	***$5M***	"All citizens aware of and enthusiastic about the ICT plan and its benefits"	2008				
	NICT Promotion and Awareness							
3	***Community Connections***	***$3M***	"50% of homes with Internet access"	2008				
	Community Connection Programme		"50 of the population as regular Internet users"	2008				
	Youth Computer Corps							
			"Public access available to all citizens" (within 15 minutes travel)	2008				
4	***Knowledge, Innovation and Development (KID)***	***$3M***	"All schools connected via high-speed Internet service"	2008				
	SchoolNet		"All teachers received ICT-related training"	2008				
	Computers for Schools							
	Teacher Training							
5	***National Archives and LibraryNet***	***$2M***	"All libraries connected via high-speed Internet service"	2008				
	LibraryNet							
	Electronic Heritage Project		"All librarians received ICT-related training"	2008				
	Historical Connections							
6	***ICT Human Capital Development***	***$6M***	"More than 10,000 ICT professionals employed in the country"	2008				
	SkillNet							
	Private Sector Training							
	Student Connections Programme							
	IT Professionals Training Programme							
7	***ICT Sector Development***	***$7M***	"Thriving and innovative ICT industry"	2008				
	Cluster Development		"New ICT sector jobs numbering in the thousands"	2008				
	"Anchor Company" Strategy							
	ICT Industry Association							
8	***Growing the e-Marketplace***	***$3M***	"50% of businesses using the Internet as a business tool, and realizing benefits from it"	2008				
	e-Business Roundtable							
	Business Modernisation Programme							
	Student Connections Programme		"New jobs numbering in the thousands"	2008				
	Business Gateway							

Appendix D1:

National ICT Plan: Programmes, Costs and Timing

#	National Programmes and Projects	Estimated Programme Cost (US$)	Milestone Objectives	Target Dates	Implementation Schedule 2004/ 2005	2005/ 2006	2006/ 2007	2007/ 2008
9	***Public Sector Reform (ICT)***	***$1M***	"A modern and efficient government organization, with all Ministries integrated through the use of ICT"	2008				
	Public Sector Reengineering							
	Government Skills Development							
	Government Service Centres							
10	***e-Government***	***$15M***	"All appropriate government information available on-line"	2006				
	Government Portal - Information							
	Government Portal - Services		"All appropriate government services available on-line"	2008				
	Government ICT Skills Development							
	e-Government (e-Procurement)							
	e-Government (e-Revenue)							
11	***e-Health***	***$3M***	"Plan for improving public health through the use of ICT"	2006				
	e-Health Feasibility Study							
12	***Connecting the Justice Community***	***$10M***	"National e-Justice Plan in place"	2006				
	e-Justice Programme		"National Security Plan utilizing ICT in place"	2006				
	National Security ICT Programme							
13	***Broadband Strategy & Implementation***	***$10M***	"National Broadband plan in place"	2005				
	National Infrastructure Taskforce & Strategy		"Broadband service to T&T"	2008				
	Broadband Roll-out							
14	***Legislative Review and Reform***	***$4M***	"Telecommunications industry open to full competition"	2006				
	Tax and fiscal incentives							
	Legislative Review							
	Consumer Protection							
	TTTEL strengthening							
	Telecom Liberalisation							

Total Cost - Four Year Plan: $82M

Appendix D2:

National Pathfinder Projects: Costs and Timing

#	Pathfinder Programmes and Projects	Estimated Cost (US$)	Pathfinder Objectives	Implementation Schedule - FY 2003/ 2004 Q1	Q2	Q3	Q4
1	***ICT Governance*** NICT Governance Programme Establish "Transition Team" Develop NICT Governance Structure Integrate NICT with existing plans Develop detailed NICT Plans	***$500k***	"Transition Team in place with responsibility for ICT foundation projects" "National ICT Governance Structure in place with responsibility for achievement of all ICT goals" "Integrated project plans prepared, and project resources identified"				
2	***Promotion and Awareness*** NICT Promotion and Awareness Programme Initiate Awareness Campaign	***$400k***	"National ICT Promotion and Awareness campaign launched" "NICT Strategy has national profile and universal awarness"				
3	***Community Access*** Connecting Communities Programme Connecting Communities Programme - Phase 1	***$400k***	"Connecting Communities Pilot Programme implemented in 6-8 sites throughout Trinidad and Tobago"				
4	***Knowledge, Innovation and Development (KID)*** Establish ICT Scholarship Programme	***$150k***	"Annual scholarships awarded for study at internationally-recognized ICT institutions"				
5	***Growing the e-Marketplace*** e-Business Roundtable Programme e-Business Development	***$400k***	"National e-Business Roundtable created" "Plan in place for development of the e-Economy" "Associations created for the study of industry-specific ICT solutions"				
6	***e-Government*** Government Portal Programme Initiate Government Portal - Phase 1	***$1.1M***	"Government Portal (Phase 1) created, featuring common look and feel, and basic information and services"				
7	***Broadband Strategy & Implementation*** National Infrastructure Taskforce Programme Develop Broadband Strategy	***$120k***	"Current bandwidth needs identified, mechanisms for accessing additional access as needed, and plan for implementing"				
8	***Legislative Review and Reform*** Legislative Review Programme Initiate Legislative Review Implement Legal and Policy Recommendations	***$120k***	"Legislative changes related to ICT identified" "Plan for implementing changes created" "Legislative and policy recommendations implemented"				

Total Cost - 1 Year "Pathfinder" Plan: ***US$3.2M***

Appendix E

Risk Management Assessment

National ICT Strategy
Risk Management Assessment

Appendix E

What is Project Risk?

All projects have elements of risks that, if not managed properly, can seriously jeopardize project success. In order to manage risk it is important to have a clear understanding of what risk is. Risk is the impact of uncertainty or the inevitability that even the best laid plans can be confounded by unexpected events, false assumptions or human failure. In other words, risk management is about identifying what could go wrong as a result of internal or external events, and planning appropriate actions to prevent or minimise the impact. Experience has shown that risk cannot be totally eliminated from any initiative, however if managed proactively it can be minimised and in some cases even avoided.

This preliminary risk assessment was conducted using input from Working Group members. The objectives of this assessment were to:

- Identify and describe risks associated with the development and implementation of the National ICT Plan;
- Assess the probability and impact of each risk to determine relative priority and needs; and,
- Develop mitigating actions to help minimise the adverse effects of risk on the NICT Plan.

The purpose of this document is to identify key risks to the success of the NICT Plan, and corresponding mitigation strategies.

Risk Assessment Approach

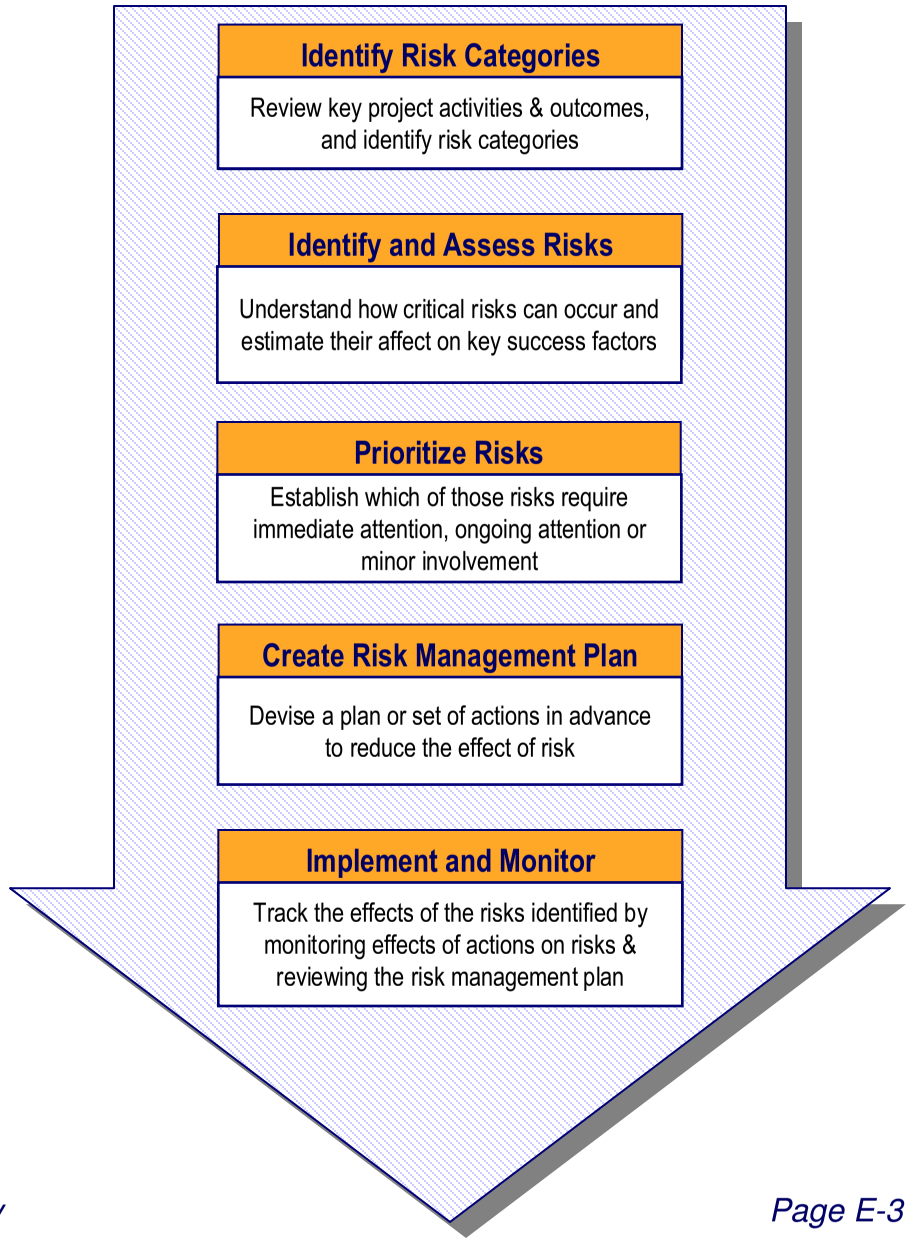
Step 1: Identify Risk Categories
- Review NICT Strategy scope, potential programmes and projects, stakeholder groups and desired outcomes, and identify broad categories of risk

Step 2: Identify and Assess Risks
- Identify risks that could emerge within each category, and assess probability and impact

Step 3: Prioritize Risks
- Classify and rank risks in priority according to the perceived probability and impact on the National ICT Strategy.

Step 4: Create Risk Management Plan
- Determine appropriate mitigating actions, depending on the nature and priority of the risks. Actions are then summarized and consolidated into a formal risk management plan, and integrated into the overall NICT project plan.

Step 5: Implement and Monitor
- Manage risks through appropriate actions, monitor results and update plan as appropriate.



Risk Management Plan

Risk Category: Governance/Management/Coordination

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Lack of transparency and accountability in management of the funds	High	High	• Presidential appointment of members to "oversight committee" • Ensure appropriate "checks and balances" of governing bodies • Involving IDB funding comes with built-in control mechanisms • Access (publication) of funding mechanisms (FOI) • Creation of Charter documenting rules, guiding principles for management body ("proactive publication of information") in order to overcome lack of sharing of information	High
Coordination of projects between/ within Ministries and other entities	High	High	• Review and modify current Ministry funding processes, emphasizing incentives for coordination • Management of funds to be with coordinating body • Establishment of overarching management body for ICT projects • Identification of criteria for projects under ICT banner – part of pre-planning process for budgets • Institutionalize existing structures involving Planning, Finance and MPAI	High
Project could become unmanageable if "scope creep" occurs	High	Medium	• Create approval process in place before project implementation • Tight, formal change management procedures (be wary of time delays due to rigidity) • Comprehensive list of criteria for inclusion as an "ICT project"	High

Risk Management Plan

Risk Category: Funding/ Financing/ Procurement

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Delays caused by procurement process	High	High	• Investigate creation/ utilization of "fast track" procurement process • Create/ use autonomous bodies for project procurement (e.g. RHA) • Realistic timeline planning where possible	High
External funding may come with unfavourable conditions attached	High	Medium	• Clearly define objectives and milestones required for funding • Good negotiating team for the loan • Alternative funding sources available	High
Escalating project costs (e.g. cost overruns)	Med	High	• Experienced and skilled project managers (hire or train) • Clearly define project milestones and objectives	High
Inadequate funds available to implement NICT Plan	Med	Med	• Prioritize project components • Continue to work closely with IDB for the development of the plan • Explore additional funding sources	Medium
Government faces large unexpected costs	High	Low	• Contingency funding plan • Prioritize projects and components	Medium

Risk Management Plan

Risk Category: Technology

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Technology used to prevent competitors from entering markets	High	Low	• Avoid proprietary solutions where possible – embrace open solutions – "avoid solutions that lock you in" • Promote open systems standards and interconnection standards • Legislative framework in place • Properly functioning Telecom Authority (adequately enabled?)	Medium
"Technology drives the solution" – get enchanted with new technology, regardless of fit with requirements	Med	Med	• "Don't chase technology" • Ensure users define functional requirements • Properly balanced project team (tech and non-tech)	Medium
Technology obsolescence	Med	Med	• Incentives for people to try new technologies • Long-term planning by technology experts • Use of appropriate and compatible technology	Medium

Risk Management Plan

Risk Category: Resource/ Organizational Capacity

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Appropriate people not available to implement all projects	High	High	• Define skills required for ICT plan • Attract, develop and retain appropriate persons with appropriate skills • Reward and compensate • Outsource where appropriate • Sensitize HR managers on use of appropriate resources?? (avoid vagueness of ICT task/ skill descriptions)	High
Inadequate organizational framework to execute project	High	High	• Build the need for the framework within the body of the Plan • Project framework to sit outside existing government during the execution of the process (set up separate authority) • Ensure appropriate budget to support the framework	High
Bureaucratic hiring process is inadequate to meet timely resource needs	High	High	• Develop and use “fast track” hiring process (through new ICT authority)	High

Risk Management Plan

Risk Category: Communication/ Marketing

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Lack of national ownership of NICT Plan; Loss of stakeholder support; Lack of coordinated activities between entities;	High	Med	• Stakeholder analysis and communication plan (including segmentation, outreach program…) • Continuous public awareness using all media • Highlight and celebrate achievements • Ensure responsive feedback mechanisms • Link communications process to real deliverables (manage expectations)	High
Lack of funding to sustain communications initiatives	High	Low	• Ensure communications included in overall project funding plan	Medium

Risk Management Plan

Risk Category: Political

Issues and Concerns	Impact	Probability	Mitigation Strategies:	Priority
Loss of political support	High	Low	• Develop "grassroots pull" • Ensure "quick wins" (2003/04) • Build on existing support… • "Depoliticize" the Plan • Ensure politicians included as a stakeholder group in stakeholder analysis	Medium

Summary of Key Risks and Strategies

#	Key Risks	Mitigating Strategies
1	"Procurement process that is inadequate for NICT fails to deliver key resources in timely fashion"	Actions recommended include the creation and utilisation of "fast-track" procurement and hiring processes for the NICT Plan. Examples of such processes currently exist within Government. Despite using such mechanisms, it was recommended that realistic timeline planning be used as much as possible.
2	"Lack of project coordination and integration within Government, and between Government and stakeholders, results in project failure"	The establishment of an overarching management body to be responsible for the funding and delivery of NICT programmes and projects was the key recommendation. Toward this goal, there are thought to be some opportunities to institutionalise existing structures involving the Ministries of Planning, Finance and Public Administration and Information. Additionally, as part of pre-planning process for budgets, Ministries will be encouraged to identify ICT-related projects, using criteria identified by the NICT management body. In general, the creation of robust governance structures for ICT is thought to be the most effective way to prevent project failure.

Summary of Key Risks and Strategies

#	Key Risks	Mitigating Strategies
3	"Appropriate human resources required for Plan implementation are not available"	The skill sets associated with Strategy implementation must be identified before resourcing plans can be developed. If resources with these skills cannot be found within government, it will be necessary to find ways to attract, develop and retain appropriate persons. Skilled individuals who are very much in demand will need to be appropriately compensated. Acquiring resources from outside the country must not be overlooked, especially when seeking specialised skills.
4	"Lack of public buy-in and support for NICT Plan limits it to a 'made-by-government' initiative"	A stakeholder analysis and communication plan must be developed, which identifies the unique informational needs of different segments of the population (e.g. seniors, businesspeople, children, etc.). Using all media, public awareness campaigns must enthusiastically deliver the ICT message. The plan will highlight and celebrate achievements. It will also provide responsive feedback mechanisms to ensure that communication flows both ways. Various elements of the plan must be given to the private sector and local communities for design and implementation. Wide ownership of the plan must be clearly demonstrated and communicated.
5	"Loss of political support for NICT results in project delays or stoppage"	In order to be the NICT Strategy to be successful, it is important that it be driven by "grassroots pull". The demands of citizens, groups and businesses for greater ICT development must give the project sufficient strength to overcome political agendas or inertia. In the early stages, this will be achieved by ensuring the public is aware of the real and tangible benefits produced by the project through an effective communication campaign.

Ongoing Management and Actions

- In the short term, a newly-created Transition Team will retain ownership and ongoing management of NICT-related risk management
- Quarterly updates of risk management plan should be undertaken and reported to the NICT Steering Committee, and to Cabinet
- More detailed risk assessment analyses will be conducted by the project managers for individual NICT programmes and projects as part of the design, build and implementation phases
- Identified risk mitigating strategies will be assigned, implemented and monitored by appropriate project team members

#	Risk Area	Action Taken	Result	Date

Appendix F
Acknowledgements

F. List of Acknowledgements

1. **NICT Steering Committee**
   a. Senator the Honourable Dr. Lenny K. Saith
   b. Senator the Honourable Danny Montano
   c. The Honourable Kenneth Valley
   d. Senator the Honourable Conrad Enill
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15. Staff of Public Service Transformation Division

16. Staff of Public Service Academy

17. Central Statistical Office

18. Ministry of Education

19. Ministry of Labour

20. National Institute of Higher Learning and Research

21. Schlumberger

22. Staff of MORI

23. Staff of Government Printery

24. Other members of Staff, Ministry of Public Administration and Information

Media

25. Members of the Media

a. Trinidad Publishing Company
b. Express Newspapers
c. Newsday
d. The Wire
e. Caribbean Communications Network
f. National Broadcasting Network Limited

26. Attendees at the open forums held in North, South and Tobago:

North

C.	Farmer
Paula-Maria	Hospedales-Bosland
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Sheldon	Pouchet

27. Suppliers

a. Dasaco Enterprise
b. Hilton Trinidad
c. Hilton Tobago
d. Cara Suites
e. Crowne Plaza
f. Y DeLima
g. Nigel Parker
h. Alto Investments
i. University of the West Indies

28. Mr. Kyron Danclair

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